United States Department of Agriculture
Natural Resources Conservation Service

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2011 ANNUAL TECHNICAL REPORT

JAMES E. "BUD" SMITH PLANT MATERIALS CENTER

Serving Texas, southwestern Oklahoma, eastern New Mexico, southeastern Colorado, and southwestern Kansas

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UNITED STATES DEPARTMENT OF AGRICULTURE

NATURAL RESOURCES CONSERVATION SERVICE

JAMES E. "BUD" SMITH PLANT MATERIALS CENTER

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Robert D. Ziehr - Texas
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Plant Materials Center Personnel

Gary L. Rea, Manager
Bandon Carr, Soil Conservationist
Randy Kuehler, Biological Science Technician

HISTORY

The Natural Resources Conservation Service/James E. "Bud" Smith Plant Materials Center had its beginning in 1935 in San Antonio, Texas. The San Antonio Nursery was established under the Soil Erosion Service. It later became the Soil Conservation Service (SCS), which is known today as the Natural Resource Conservation Service (NRCS). In the late 50's and early 60's there were two Plant Materials Centers operating through a cooperative enterprise between the Texas Agriculture Experiment Station and the Soil Conservation Service. The Spur, Texas Plant Materials Center was the primary center with the San Antonio Plant Material Center being a sub-center. The Spur Plant Materials Center was located on 48 acres of irrigated land and the San Antonio Sub-Center was located on 30 acres of irrigated land. Seed production from both of the centers was processed at the Big Spring Field Station. It appears that both Plant Materials centers were closed in 1964 and all material moved to Knox City in 1965 when the Knox City Plant Materials Center was establish. Since 1965 all of the seed production has been processed at Knox City.
On September 7, 1967, the Knox City Plant Materials Center (PMC) was given the honorary name of James E. "Bud" Smith Plant Materials Center in honor of Bud's dedicated service in early plant science work from 1935 up until 1965. The PMC original long-term lease from Mr. T. R. Campbell was for 60 acres of irrigated land. The current lease is for 137.5 acres of his land.

Past Managers at the NRCS/James E. "Bud" Smith PMC	**Dates**
Arnold G. Davis	2/1965 to 6/1966
Howard A. Carleton	11/1968 to 5/1969
Jacob C. Garrison	5/1969 to 7/1974
David G. Lorenz	9/1974 to 3/1984
Jon B. Muncrief	1984 to 8/1985
James S. Alderson	2/1986 to 1/1990
Morris J. Houck	6/1990 to 9/2006
Ray T. Cragar	4/2007 to 7/2008
Gary L. Rea Ph. D	10/2008 to present

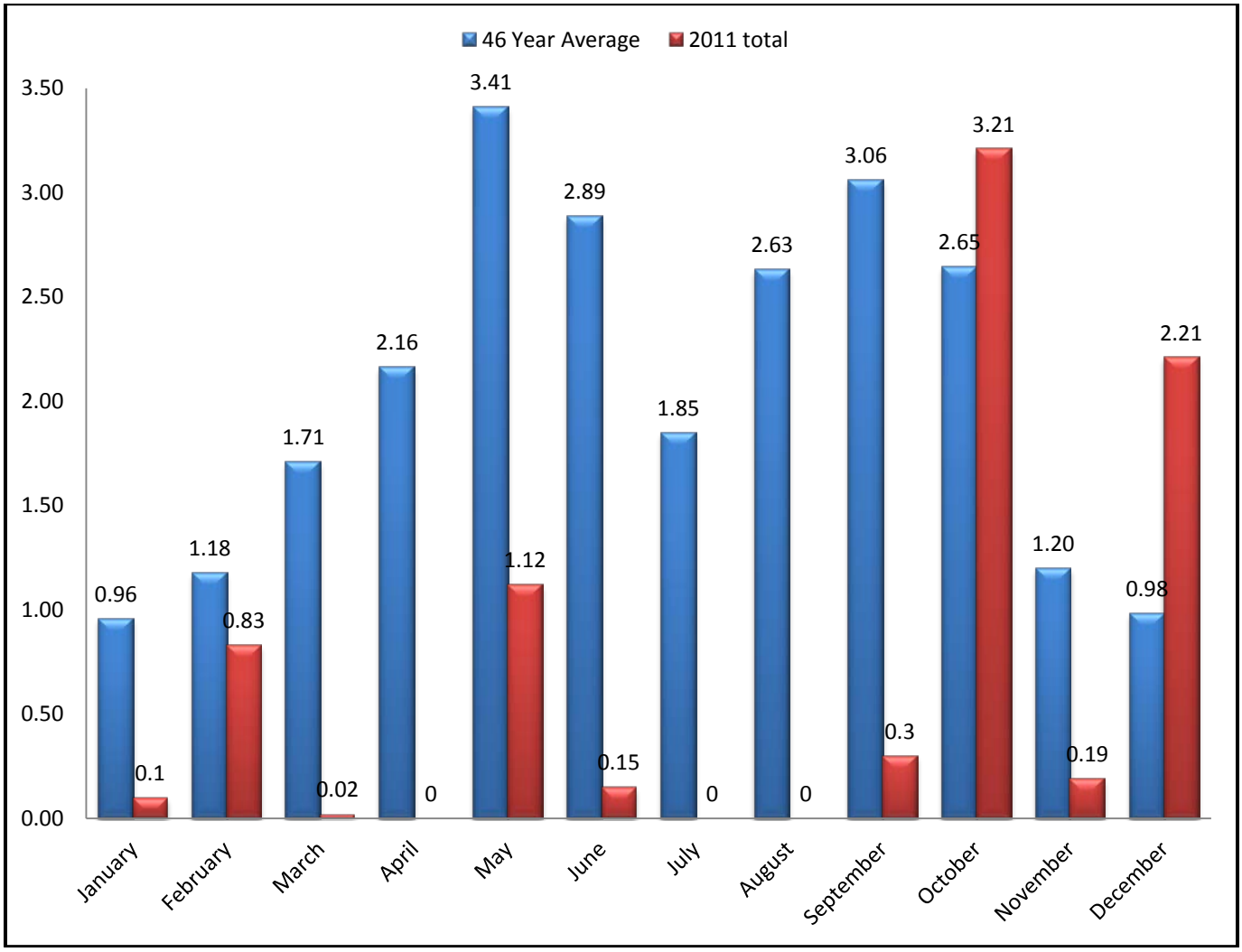
INTRODUCTION

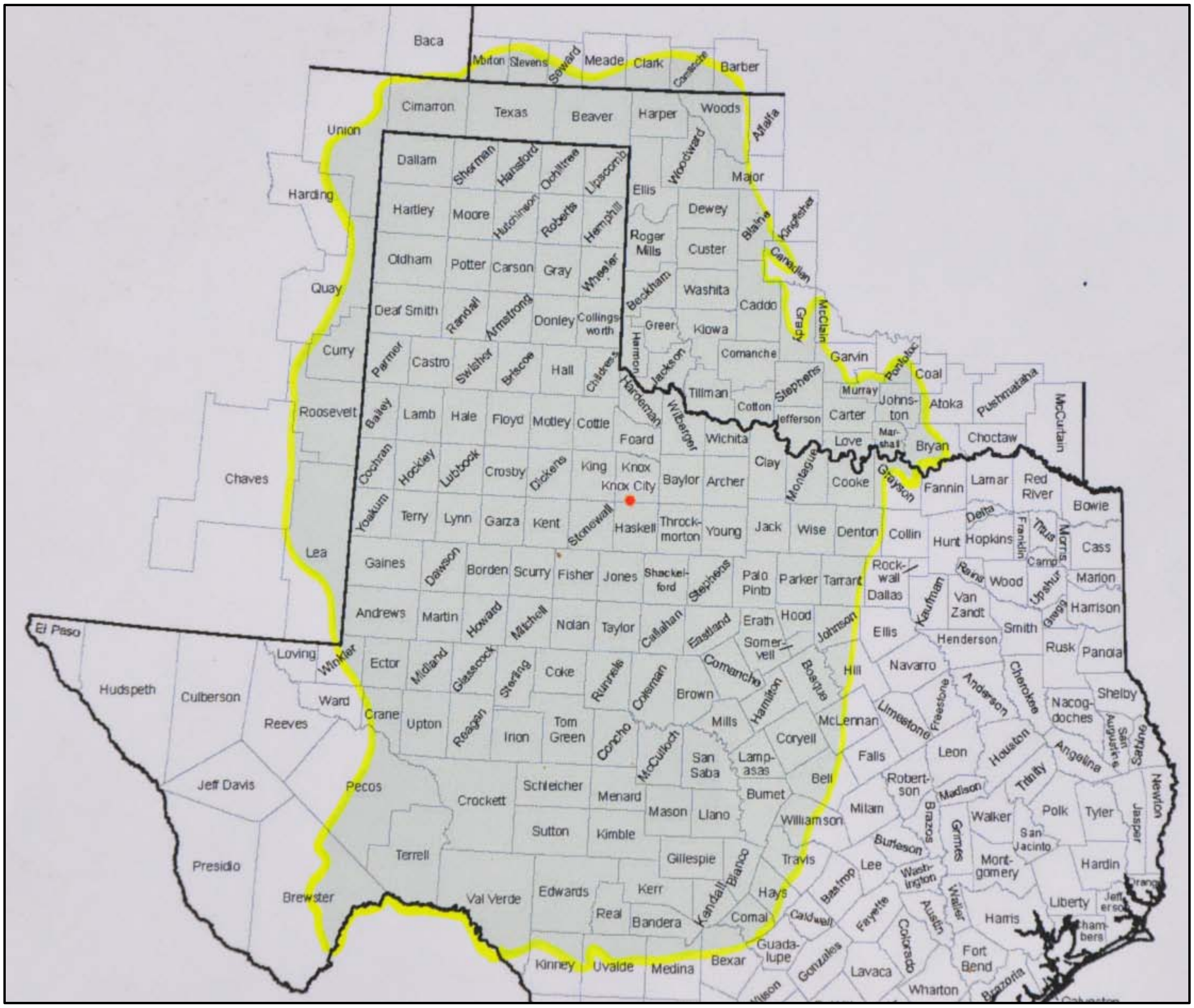
The James E. "Bud" Smith Plant Materials Center is responsible for developing conservation plants and cultural techniques for use on targeted Major Land Resource Area (MLRA) in Texas, Oklahoma, Kansas, Colorado, and New Mexico.

The Plant Materials Center is located approximately 4½ miles NW of Knox City, Texas, in the Rolling Red Plains Land Resource Area. The site is located about 33° north latitude, 100° west longitude and 1500 feet above sea level. Seven shallow irrigation wells supply irrigation water to all fields through an underground pipeline.

Approximately 90 percent of the soil at the PMC is a friable loam or fine sandy loam. Surface soil varies in depth from 10 to 30 inches with sandy clay loam or clay subsoil. The remainder of the soil is slightly heavier, having a fine sandy loam surface soil over clay loam subsoil with a caliche layer between 20 and 36 inches. Water erosion is not usually a problem, but wind erosion poses a constant threat, especially during late winter and spring. On fallow fields, cover crops and tillage practices are applied to control wind erosion.

The PMC has a long-term average of 230 frost-free days in its growing season. Rainfall for 2011 was recorded at 8.13 inches, which is significantly lower than the 46-yr average of 24.67 inches. Precipitation for the Center is mainly received in the form of spring, summer and fall rain showers. Snowfalls during winter were few and contributed minor amounts to total precipitation.





SERVICE AREA

The service area of the NRCS James E. "Bud" Smith Plant Materials Center includes a large portion of Texas, southwestern Oklahoma, and a portion of Kansas, Colorado, and New Mexico. The work here is coordinated with the work done at other Plant Materials Centers in Texas and throughout the United States. The shady portions of the map below indicate the Service area.

JAMES E. "BUD" SMITH PLANT MATERIALS CENTER LONG RANGE PLAN

I. Introduction

The mission of the Plant Materials Program is to develop and deliver plant science technology to meet customer and resource needs. The purpose of the Plant Materials Program is to carry out specialized activities in resource conservation, as part of the overall program of the Natural Resources Conservation Service. It is the responsibility of the Plant Materials Center to: 1.) assemble, test, and release plant materials for conservation use, 2.) determine techniques for the successful use and management of conservation species, 3.) facilitate the commercial increase of conservation plant species, 4.) provide for the development and transfer of state of the art applied science technology.

The PMC Long Range Plan (LRP) is used to identify, guide, and direct PMC operation toward solving high-priority resource problems identified in the State(s) Plant Materials LRP. **The James E. "Bud" Smith PMC is directed by needs identified in the Long Range Plans of Texas, Oklahoma, Kansas, Colorado, and New Mexico. It is consistent with goals and objectives identified in the NRCS Strategic Plan.**

II. Long Range Plan Development

This Long Range Plan (LRP) was developed in accordance with the revised National Plant Materials Manual, Part 540.22. This plan is intended to be used as a guide for directing plant materials center activities within the state of Texas, portions of Oklahoma, Kansas, Colorado, and New Mexico.

The Plant Materials Center Technical Advisory Committee(s) is responsible for identifying customers, resource, and program needs. The Technical Advisory Committee consists of representatives from NRCS and other federal and state agencies, private industry, and universities. Advisory members may have an interest due to financial contributions made to the center.

Needs were categorized by the NRCS Goals and Objectives as listed in the revised National Plant Materials Manual, Exhibit 539.1, NRCS Goals and Objectives.

The Technical Advisory Committee recommends studies needed at the center to meet identified concerns. Specific study areas and special concerns are defined by the Technical Advisory Committee and reviewed by the State Conservationist Advisory Committee. Projects budgeted are incorporated into the Center's Business Plan and Workload Analysis.

<u>General Description of the Service Area</u>

Climate - USDA Plant Hardiness Zones 5b through 8b are within the area served. Rainfall is quite varied both in annual amount and in seasonal distribution, but predominately occurs in the form of rainfall. Annual precipitation averages of individual climatological stations range from about 12 to 36 inches.

Major Land Resource Areas - Included in the service area is all or portions of eighteen major land resource areas. MLRAs include the following:

67B – Central High Plains, Southern Part
42 – Trans-Pecos
70A – Canadian River Plains and Valleys
70B – Upper Pecos River Valley
77A, B, C, D, E - Southern High Plains
78A, B, C, D - Central Rolling Red Plains
80A - Central Rolling Red Prairies
80B - North Texas Central Prairies
81A, B, C, D - Edwards Plateau
82A, B - Texas Central Basin
83A – Northern Rio Grande Plain
83B – Western Rio Grande Plain
84A - Cross Timbers
84B - West Cross Timbers
84C - East Cross Timbers
85 - Grand Prairie
86A - Northern Texas Blackland Prairies
87B – Texas Claypan Area, Northern Part

A detailed description of MLRAs, land use, and climate may be found in the reference "Land Resource Regions and Major Land Resource Areas of The United States", Agricultural Handbook 296.

III. NRCS Objectives, Needs, Recommended Actions

The plant material needs of the James E. “Bud” Smith PMC fall into five categories according to NRCS Objectives:

NRCS Objective: 2.1 Healthy and productive cropland sustaining U.S. agriculture and the environment.

A. Plant selection and cultural technique development for stabilization of soils that have high erosion potential.

Problem:
Plant materials are needed that have the innate ability to establish and maintain themselves on sandy soils and control wind erosion. Three major land resource areas in Oklahoma and sixteen MLRA's in Texas are affected, resulting in a total of 4.7 million acres needing attention.

Objective:
To identify, collect, develop technology, and cooperatively release plant selections and techniques for the stabilization of sandy soils with high erosion potential.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous releases:
'Mason' sandhill lovegrass

'Alamo' switchgrass
'Rainbow' wild plum
'Lometa' Indiangrass
'Haskell' sideoats grama
'Sabine' Illinois bundleflower
'Comanche' partridge pea
'Van Horn' green sprangletop
'Earl' big bluestem
Potter County Germplasm spike dropseed
Borden County Germplasm sand dropseed
Cottle County Germplasm sand bluestem
OK Select Germplasm little bluestem
Hondo Germplasm velvet bundleflower
Cuero Germplasm purple prairie clover
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of Plains Germplasm prairie acacia
Evaluation of Havard panicum

B. Woody species for wind erosion control and wildlife habitat.

Problem:
Adapted woody plant materials that are easily established, fast growing and long-lived are needed for windbreaks. In addition to erosion control, windbreaks will provide wildlife habitat and enhance beautification of the landscape. Nine major land resource areas in Texas and five in Oklahoma are involved.

Objective:
To identify, collect, develop technology, and cooperatively release plant selections and techniques for use in windbreak planting and design.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous releases:
'Rainbow' wild plum
'Yellow Puff' littleleaf leadtree
'Boomer' bur oak
Kerr Germplasm Wright pavonia
Current plant science studies:
Currently no studies

NRCS Objective: 2.2 Healthy watersheds providing clean and abundant water supplies for people and environment.

A. Ground cover vegetation for critically eroding areas to reduce soil loss and improve water quality.

Problem:

There is a need for plant materials and techniques for stabilization of critically eroding areas. All major land resource areas in both states totaling approximately 2.5 million acres are affected need vegetative treatment.

Objective:
To identify, collect, develop techniques, and cooperatively release adapted vegetation for stabilization of critically eroding areas.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous releases:
'Texoka' buffalograss
'Alamo' switchgrass
'Aztec' Maximilian sunflower
'Rainbow' wild plum
'Saltalk' alkali sacaton
'Haskell' sideoats grama
'Sabine' Illinois bundleflower
'Comanche' partridge pea
'Van Horn' green sprangletop
'Overton R18' rose clover
'Earl' big bluestem
Potter County Germplasm spike dropseed
Borden County Germplasm sand dropseed
Duck Creek Germplasm Texas dropseed
Cottle County Germplasm sand bluestem
Hondo Germplasm velvet bundleflower
Cuero Germplasm purple prairie clover
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of Pains Germplasm prairie acacia
Evaluation of Havard panicum
Evaluation of purpletop

B. Plant selection and cultural techniques for saline and/or alkaline soil conditions.

Problem:
There is a need for adapted plant materials, which are tolerant of saline and/or alkaline soil conditions. All major land resource areas in Texas and four in Oklahoma, totaling more than 1.2 million acres, are affected by different levels of salinity or alkalinity that are either naturally occurring or induced by oil field related activities. (See respective long-range Plant Materials Programs - Oklahoma and Texas).

Objectives:
To identify tolerant materials and techniques for saline or alkaline sites by:

---testing known cultivars for their adaptability.
---collect and evaluate of plants from sites.
---evaluating techniques needed to enhance establishment.
---release adapted plants and techniques.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous Releases:
'Selection 75' kleingrass
'Alamo' switchgrass
'Aztec' Maximilian sunflower
'Lometa' Indiangrass
'Saltalk' alkali sacaton
'Haskell' sideoats grama
Potter County Germplasm spike dropseed
Borden County Germplasm sand dropseed
Duck Creek Germplasm Texas dropseed

Current plant science studies:
Evaluation of Havard panicum

NRCS Objective: 2.3 Healthy and productive grazing land sustaining U.S. agriculture and the environment.

A. Species selection and cultural technique development needed for the enhancement of water quality, improvement of range and pastureland and to promote food and cover for wildlife.

Problem:
There is a need for commercially available adapted plant materials indigenous to the climates of Texas, Oklahoma, Kansas, Colorado, and New Mexico. All major land resource areas in these states need treatment with locally adapted plants.

Adapted species are needed to help improve water quality, provide forage for wildlife during critical periods and provide food/cover for wildlife.

Objective:
To identify, collect, develop, and cooperatively release grasses, forbs, legumes, and woody species adapted to Oklahoma and Texas.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Previous releases:
'Selection 75' kleingrass
'Mason' sandhill lovegrass
'Alamo' switchgrass
'Aztec' Maximilian sunflower
'T-587' old world bluestem
'Rainbow' wild plum
'Lometa' Yellow Indiangrass
'Yellow Puff' littleleaf leadtree
'Saltalk' alkali sacaton
'Haskell' sideoats grama
'Sabine' Illinois bundleflower
'Comanche' partridge pea
'Plateau' awnless bushsunflower
'Van Horn' green sprangletop
'Earl' big bluestem
Kerr Germplasm Wright's pavonia
San Marcos Germplasm eastern gamagrass
Cottle County Germplasm sand bluestem
OK Select Germplasm little bluestem
Hondo Germplasm velvet bundleflower
Cuero Germplasm purple prairie clover
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of sweet Indianmallow
Evaluation of purpletop

Evaluation of Plains Germplasm prairie acacia

NRCS Objective: 2.4 Healthy and productive wetlands sustaining watersheds and wildlife.

A. Wetland vegetation selection and cultural techniques for water quality improvement.

Problem:
There is a need for plant materials and techniques that are adapted for water quality use. All major land resource areas in both states are affected and need adapted species. Urban and rural wastewater treatments, streambank stabilization and drinking water quality improvement are major concerns in the area.

Objective:
To identify, collect, develop techniques and cooperatively release adapted vegetation for water quality improvement.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

Released Plant Materials
'Alamo' switchgrass
'Aztec' Maximilian sunflower
'Rainbow' wild plum
'Haskell' sideoats grama
'Sabine' Illinois bundleflower
'Comanche' partridge pea
'Van Horn' green sprangletop
'Earl' big bluestem
San Marcos Germplasm eastern gamagrass
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of Plains Germplasm prairie acacia
Technical evaluation of purpletop

NRCS Objective: 2.5 High-quality habitats on private land supporting the Nation's wildlife heritage.

A. Species selection and cultural technique development needed to promote food and cover for wildlife.

Problem:
There is a need for commercially available adapted plant materials indigenous to the major land resources in Texas, Oklahoma, Kansas, Colorado and New Mexico.

Objective:
To identify, collect, develop and cooperatively release grasses, forbs, legumes, and woody species adapted to Texas, Oklahoma, Kansas, Colorado and New Mexico for wildlife.

Procedure:
Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and selected off-center sites.

Previous released species, assemblies under evaluation and cultural studies will be evaluated at the center and at selected off-center sites.

‘Alamo’ switchgrass
‘Aztec’ Maximilian sunflower
‘Rainbow’ wild plum
‘Yellow Puff’ littleleaf leadtree
‘Sabine’ Illinois bundleflower
Hondo Germplasm velvet bundleflower
Cuero Germplasm purple prairie clover
Kerr Germplasm wright pavonia
‘Boomer’ bur oak
‘Plateau’ awnless bushsunflower
‘Eldorado’ Engelmanndaisy
Plains Germplasm prairie acacia

Current plant science studies:
Evaluation of Plains Germplasm prairie acacia
Technical evaluation of purpletop

TECHNOLOGY TRANSFER

PUBLICATIONS

Tech Notes:

- Potential Plants for Biofuel in Texas. USDA/NRCS James E. “Bud” Smith PMC, Knox City, TX. November 2010.
- Pollinator Plants for North-Central and West Texas and Southwestern Oklahoma USDA/NRCS James E. “Bud” Smith PMC, Knox City, TX. April 2011.

Abstracts:

- In-Field Weathering Influences Harvestable Biomass and Biofuel Quality of Switchgrass Cultivars. W.F.Kuenstler, C.B. Carr, J.L. Douglas, J.L. Lemunyon, B.S. Baldwin. Southern Association of Agricultural Scientists, Corpus Christi, TX. February 2011.
- Forage Quality Dynamics of Warm Season Grasses during the Growing Season in West-Central Texas. J.L. Douglas, H. Sanchez, G.L. Peacock, K.E. Spaeth, G.L. Rea, R.D. Ziehr, J.P. Muir. Society for Range Management, Billings, MT. February 2011.
- Growth and Forage Quality of Warm Season Grasses During the Growing Season in West-Central Texas. G.L. Rea, R.D. Ziehr, J.L. Douglas, J.P. Muir. 10th Annual Texas Plant Conservation Conference and Texas Native Plant Conservation Alliance Meeting, Austin, TX. September 2010.
- In-Field Weathering Influences Harvestable Biomass and Biofuel Quality of Native Warm Season Grasses. C.B. Carr, R.D. Ziehr, J.L. Douglas, J.L. Lemunyon, B.S. Baldwin. 7th Eastern Native Grass Symposium, Knoxville, TN. October 2010.

Reports:

- KCPMC 2010 Annual Tech Report. USDA/NRCS James E. “Bud” Smith PMC, Knox City, TX. May 2011.
- 2010 Progress Report of Activities. USDA/NRCS James E. “Bud” Smith PMC, Knox City, TX. December 2010.

Release Brochures:

- ‘Eldorado’ Engelmann’s Daisy, *Engelmannia* peristenia. USDA/NRCS James E. “Bud” Smith PMC, Knox City, TX. July 2011.
- ‘Aztec’ Maximilian Sunflower, *Helianthus maximiliani*. USDA/NRCS James E. “Bud” Smith PMC, Knox City, TX. July 2011.

Plant Decription Sheets:

- Narrow Leaf Globe Mallow, *Sphaeralcea angustifolia*-Species Collection Description Sheet. James E. “Bud” Smith PMC, Knox City, TX. April 2011.
- Roundhead Lespedeza, *Lespedeza capitata*-Species Collection Description Sheet. James E. “Bud” Smith PMC, Knox City, TX. April 2011.
- Slimflower Scurfpea, *Psoralea tenuiflora*-Species Collection Description Sheet. James E. “Bud” Smith PMC, Knox City, TX. April 2011.
- Switchgrass, *Panicum virgatum*-Species Collection Description Sheet. James E. “Bud” Smith PMC, Knox City, TX. April 2011.
- Hall’s Panicum, *Panicum hallii*-Species Collection Description Sheet. James E. “Bud” Smith PMC, Knox City, TX. April 2011.
- Plains Lovegrass, *Eragrostis intermedia*-Species Collection Description Sheet. James E. “Bud” Smith PMC, Knox City, TX. April 2011.

Newsletters/ Articles:

- Knox City Knowledge. Winter 2011. USDA/NRCS James E. “Bud” Smith PMC, Knox City, TX. Volume 2, Issue 2.
- Knox City Knowledge. Summer 2011. USDA/NRCS James E. “Bud” Smith PMC, Knox City,

TX. Volume 2, Issue 3.
- Small Burnet, *Sanguisorba minor*. The Reverchon Naturalist, Weatherford, TX. Volume 5, Sept.-Oct. 2010.
- 'Aztec' Maximilian Sunflower, *Helianthus maxilian*. The Reverchon Naturalist, Weatherford, TX. Volume 8, Mar.-Apr. 2011.
- Cuero Germplasm Purple Prairie Clover, *Dalea purpurea*. The Reverchon Naturalist, Weatherford, TX. Volume 10, Jul.-Aug. 2011.

TRAINING SESSIONS

- Plant Id Training. Gary Rea and Brandon Carr. USDA/NRCS James E. "Bud" Smith PMC, Knox City, TX. May 2011.
- Native Plant Collection. Gary Rea. USDA/NRCS James E. "Bud" Smith PMC, San Angelo, TX. May 2011.
- Plant Materials Program Training. PMC Staff. USDA/NRCS James E. "Bud" Smith PMC, Knox City, TX. July 2011.

TOURS

- Haskell Garden Club. Gary Rea and Brandon Carr. USDA/NRCS James E. "Bud" Smith PMC, Knox City, TX. October 2010.
- Knox City 2nd Grade Science Class Tour. Brandon Carr and Gary Rea. USDA/NRCS James E. "Bud" Smith PMC. April 2011.

PRESENTATIONS

- In-Field Weathering Influences Harvestable Biomass and Biofuel Quality of Native Warm Season Grasses. Joel Douglas. Knoxville, TN. October 2010.
- Native Plant Society of Texas Symposium 2010. Gary Rea. Denton, TX. October 2010.
- Purpose and Operation of the James E. "Bud" Smith PMC. Gary Rea. Knox City, TX. October 2010.
- James E. "Bud" Smith PMC Program. Gary Rea. San Angelo, TX. October 2010.
- Knox City PMC Operations. Gary Rea. Alpine, TX. December 2010.
- Forage Quality Dynamics of Warm Season Grasses in West-Central Texas. Joel Douglas. Billings, MT. February 2011.
- In Field Weathering Influences Harvestable Biomass and Biofuel Quality of Switchgrass Cultivars. W.F. Kuenstler. Corpus Christi, TX. February 2011.
- Update on James E. "Bud" Smith Plant Materials Center. Gary Rea. Austin, TX. February 2011.
- Plant Materials Program. Gary Rea and Brandon Carr. Seymour, TX. April 2011.
- Plant Materials Development Process. Gary Rea. Nacogdoches, TX. May 2011.

STUDIES

The Plant Materials Center staff plan and develop studies to solve problems identified in the PMC's Long-Range Plan. All active studies are listed below with the study number and name and their objectives. Each study is identified in the following pages.

Study Number and Name: 48I187J Evaluation of sweet Indianmallow

Study Objective: Evaluate and release selected accessions of sweet Indianmallow.

Study Number and Name: 48I190S Evaluation of Havard panicum

Study Objective: Evaluation and release of selected accessions of Havard panicum.

Study Number and Name: 48I196S Evaluation of purpletop tridens

Study Objective: Evaluate and release accessions of purpletop for wildlife habitat.

Study Number and Name: TXPMC-T-0701-BF Biofuel Study
Study Objective: Evaluate timing of harvest on biomass production and fuel quality of switchgrass cultivars, big bluestem, Indiangrass and giant miscanthus.

Study Number and Name: TXPMC-P-0803-RA Legume Trial: Dr. J. Muir, TAES–Stephenville, TX
Study Objective: Evaluation of selected lines of native legumes at various sites in Texas under a prescribed management scheme.

Study Number and Name: TXPMC-T-0901-ICST-Arizona cottontop
Study Objective: Compare Arizona cottontop selections for adaptability.

Study Number and Name: TXPMC-T-0903-BF ICST- Biomass Study
Study Objective: Comparison of Warm Season Perennial Species for Biomass Production.

Study Number and Name: TXPMC-P-0904-RA Evaluation of vine-mesquite
Study Objective: Collection, assembly and evaluation.

Study Number and Name: TXPMC-P-0905-RA Evaluation of Blue Grama
Study Objective: Collection, assembly and evaluation.

Study Number and Name: TXPMC-P-0907-RA Evaluation of Threeflower melic
Study Objective: Collection, assembly and evaluation.

Study Number and Name: TXPMC-P-0908-WL Evaluation of showy menodora
Study Objective: Collection, assembly and evaluation.

Study Number and Name: TXPMC-T-0909-PA ICST-Eastern Gamagrass
Study Objective: Replicated Study of Four Releases of Eastern Gamagrass

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Study Number and Name: TXPMC-P-1001-RA Evaluate Original Accessions of Prairie Acacia for Possible Tested or Cultivar Release
Study Objective: Select superior line from bulk used in Plains Germplasm

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Study Number and Name: TXPMC-T-1002-RA Sampling Protocol for Established and Newly Planted Perennial Grasses for Vegetative Barriers
Study Objective: Collect raw measurements on various perennial grasses used as vegetative barriers in order to develop a conservation planning tool.

Study Number and Name: TXPMC-P-1003-PA Initial Evaluation of Texas Cupgrass (*Eriochloa sericea*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1004-WL Initial Evaluation of Prairie Bundleflower (*Desmanthus leptolobus*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1005-PA Initial Evaluation of Western Wheatgrass (*Pascopyrum smithii*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1006-RA Initial Evaluation of Pink Smartweed (*Polygonum pensylvanicum*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1007-CR Initial Evaluation of Knotgrass (*Paspalum distichum*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-T-1101-PA Evaluating Warm Season Grasses for Winter Stockpiling
Study Objective: Evaluate warm season grasses by nutrient quality, forage production, and grazing management through winter months

Study Number and Name: TXPMC-P-1102-RA Initial Evaluation of Roundhead lespedeza (*Lespedeza capitata*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1103-PA Initial Evaluation of Switchgrass (*Panicum virgatum*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1104-PA Initial Evaluation of Plains Lovegrass (*Eragrostis intermedia*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1105-PA Initial Evaluation of Hall's Panicum (*Panicum hallii*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1106-RA Initial Evaluation of Scurfpea (*Psoralea tenuiflora*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-P-1107-WL Initial Evaluation of Narrow Leaf Globe Mallow (*Spaeralcea angustifolia*)
Study Objective: Collection, assembly and evaluation

Study Number and Name: TXPMC-T-1108-PA Germination and Emergence of Three Cultivars of Switchgrass
Study Objective: Compare the emergence and germination of three common switchgrass cultivars to determine if seed production environment contribute to seed quality

Study No. : 48I187J - Evaluation of *Abutilon fruticosum*, sweet Indianmallow

Objective: Evaluate an assembly of sweet Indianmallow and select a superior plant to primarily enhance water quality, for improvement of range and pastureland, and to promote food and cover for wildlife.

Evaluation Factors: Evaluate plants for emergence, survival, vigor, stand, early bloom, freeze recovery and drought tolerance.

Progress or Status: Thirteen accessions survived in the greenhouse and were transplanted in June of 2009. Plants were evaluated by survival, maturity, flower color, and plant height. The accessions selected for this study are 9064878, 9049589, 9064853, 9064883, 9049560, 9049539, 9049559, 9064859, 9049534, 9049631, 9064870, 9064893, 9049578, 9049561, and 9049630. Accessions were set up in a randomized complete block. Observations were made twice in 2011 during the spring and again in the fall. Seed production was low due to limited moisture. Germination was run on seed harvested in 2010. Another attempt to harvest seed in 2012 should allow methods of germination to be explored.

Entry	Accession	County (TX)
1	9049561	Williamson
2	9049578	Schleicher
3	9049534	Williamson
4	9049630	Williamson
5	9049631	Caldwell
6	9064870	Bell
7	9064878	Coryell
8	9049589	Real
9	9064853	Bell
10	9064883	Gonzales
11	9049560	Parker
12	9049539	Caldwell
13	9064859	Coleman

Remarks: Transplanted on 6/3/2009 in B-1 Block

Figure 1 Plot Layout of Sweet Indian Mallow Accessions

							East									
		301	302	303	304	305	306	307	308	309	310	311	312	313		
North		213	212	211	210	209	208	207	206	205	204	203	202	201		South
		101	102	103	104	105	106	107	108	109	110	111	112	113		
							West									

Table 1 Average Data for Indian Mallow 2009-2011

En	Accession	County (TX)	Germ	Survival	Flower Color	Maturity	Plt Ht	Notes
1	9049561	Williamson	5.00%	7.67	Orange	Early	35.3	Tall and Erect
2	9049578	Schleicher	3.67%	4.00	Yellow	Mid-Late	36.7	Some Segregating (leaf color)
3	9049534	Williamson	2.00%	6.67	Orange	Early-Mid	33.7	Segregating (tall and short) (leaf shape)
4	9049630	Williamson	4.67%	7.56	Orange	Early-Mid	38.0	bushy, uniform, looks good
5	9049631	Caldwell	12.33%	6.67	Orange	Early-Mid	39.7	Segregating (tall and short)
6	9064870	Bell	4.00%	6.22	Yellow	Early-Mid	37.0	Segregating (leaf color)
7	9064878	Coryell	4.67%	6.33	Yellow	Early-Mid	40.0	Segregating (plant form)
8	9049589	Real	8.00%	5.44	Yellow	Mid-Early	36.3	Lodges
9	9064853	Bell	5.67%	5.56	Orange	Early-Mid	34.3	Segregating (leaf color)
10	9064883	Gonzales	8.33%	6.78	Orange	Mid-Late	40.3	Tall and Erect, Segregating (leaf color)
11	9049560	Parker	8.00%	6.11	Yellow	Mid-Late	38.3	
12	9049539	Caldwell	8.00%	7.67	Orange	Early	34.7	Segregating (leaf color)
13	9064859	Coleman	40.33%	6.67	Yellow	Late	34.0	

Study No. : 48I190S - Evaluation of *Panicum havardii*, Havard panicum

Objective: To evaluate an assembly of Havard panicum and select a superior plant to primarily aid in cultural techniques for saline and/or alkaline soil conditions and for stabilizing sandy soils that have high erosion potential.

Evaluation Factors: Evaluate for stand, early-stage of bloom, vigor, and freeze recovery.

Progress or Status: No evaluations were conducted this year. Selected plants were transplanted in the spring of 2010. This is a composite of 11 accessions that was given the accession #9065020. The original increase of these accessions was contaminated with switchgrass. Observations and data collection will begin in the spring of 2012.

Figure 2 Havard's Panicum Field Map

6	B							B	6
5	B			204	1003	1001	902	B	5
4	B	703	704	801	802	804	901	B	4
3	B	702	701	604	602	504	503	B	3
2	B	202	302	401	402	404	502	B	2
1	B	201	102					B	1

Study No. : 48I196S - Evaluation of *Tridens flavus,* purpletop

Objective: Evaluate for use in water quality improvement, vegetative filter strips and re-vegetation of critically eroded areas. Purpletop is frequently found in open woods and on roadsides in Pineywoods and Post Oak Savannahs in Texas. It grows in other parts of Texas, such as in the Gulf Prairies and Marshes, Blackland Prairies, Cross Timbers and Prairies, Edwards Plateau, Rolling and High Plains, but not as frequent.

Evaluation Factors: The plantings will be evaluated for early green up, uniform growth, % stand, vigor, and date of maturity.

Progress or Status: Purpletop *Tridens flavus* (L.) Hitchc. Evaluations continue to be recorded for different traits. Plant counts, early green up, maturity, vigor, percent stand, plant height, and seed production observations were recorded in 2011. While some data was beneficial, the record heat and dry conditions prevented some notes. No seed production occurred and plant growth was negatively influenced.

	2010	2011	2010	2011 Plt Cts		2010	2011	2010	2011	2010	2011 % Stand		2010	2011	2010	2011
Accession	Grn Up	Grn Up	Plt Cts	6-2	8-23	Mat.	Mat.	Vig	Vig	% St	6-2	8-23	Height	Height	Seed Prod	Seed Prod
Guard Row																
9085630	7	7	9	10	7	E	N/A	6	N/A	60.0	67	47	44	N/A	4	N/A
9065036	9	9	11	12	11	E	N/A	7	N/A	73.3	80	73	52	N/A	9	N/A
9085627	9	9	12	10	7	MS	N/A	6	N/A	80.0	67	47	54	N/A	7	N/A
9085626	8	8	10	10	9	E	N/A	4	N/A	66.7	67	60	45	N/A	6	N/A
9085656	9	9	11	10	4	E	N/A	4	N/A	73.3	67	27	49	N/A	5	N/A
9085633	7	7	9	11	8	MS	N/A	4	N/A	60.0	73	53	48	N/A	4	N/A
9085639	8	8	10	9	5	E	N/A	5	N/A	66.7	60	33	57	N/A	6	N/A
9065048	7	7	9	9	7	E	N/A	5	N/A	60.0	60	47	54	N/A	7	N/A
9065046	6	6	7	7	6	MS	N/A	5	N/A	46.7	47	40	55	N/A	5	N/A
9065003	6	6	8	9	7	E	N/A	6	N/A	53.3	60	47	53	N/A	6	N/A
9065047	6	6	8	9	8	E	N/A	5	N/A	53.3	60	53	51	N/A	5	N/A
9085628	6	6	7	10	7	L	N/A	6	N/A	46.7	67	47	51	N/A	6	N/A
9085644	5	5	6	7	6	MS	N/A	4	N/A	40.0	47	40	51	N/A	4	N/A
9065032	8	8	10	7	6	L	N/A	5	N/A	66.7	47	40	46	N/A	5	N/A
9065033	8	8	10	10	6	E	N/A	6	N/A	66.7	67	40	50	N/A	4	N/A
9065039	8	8	10	11	8	E	N/A	7	N/A	66.7	73	53	53	N/A	5	N/A
9085638	8	8	10	12	7	E	N/A	7	N/A	66.7	80	47	51	N/A	7	N/A
9085645	8	8	10	11	7	E	N/A	7	N/A	66.7	73	47	46	N/A	8	N/A
9085636	9	9	12	10	8	E	N/A	7	N/A	80.0	67	53	54	N/A	7	N/A
9064986	7	7	8	8	8	L	N/A	6	N/A	53.3	53	53	51	N/A	6	N/A
9085637	7	7	8	10	7	M	N/A	5	N/A	53.3	67	47	53	N/A	6	N/A
9085635	9	9	11	9	6	L	N/A	6	N/A	73.3	60	40	52	N/A	6	N/A
9085634	8	8	9	10	5	E	N/A	6	N/A	60.0	67	33	45	N/A	5	N/A
9065038	5	5	6	9	10	E	N/A	6	N/A	40.0	60	67	51	N/A	5	N/A
Guard Row																
Guard Row																
9085639	8	8	10	11	8	M	N/A	5	N/A	66.7	73	53	54	N/A	6	N/A
9085636	8	8	10	12	7	E	N/A	7	N/A	66.7	80	47	56	N/A	7	N/A
9085644	8	8	10	11	7	M	N/A	4	N/A	66.7	73	47	52	N/A	5	N/A
9085638	8	8	11	10	8	E	N/A	6	N/A	73.3	67	53	56	N/A	8	N/A
9065038	8	8	10	10	8	M	N/A	5	N/A	66.7	67	53	53	N/A	5	N/A
9065046	8	8	10	11	7	E	N/A	6	N/A	66.7	73	47	56	N/A	6	N/A

9085645	8	8	10	10	7	E	N/A	6	N/A	66.7	67	47	42	N/A	6	N/A
9064986	8	8	10	9	10	L	N/A	6	N/A	66.7	60	67	48	N/A	5	N/A
9085656	9	9	12	6	9	M	N/A	4	N/A	80.0	40	60	52	N/A	5	N/A
9065048	5	5	6	2	10	E	N/A	4	N/A	40.0	13	67	52	N/A	6	N/A
9065003	1	1	2	2	6	E	N/A	5	N/A	13.3	13	40	50	N/A	6	N/A
9085635	1	1	2	5	6	M	N/A	4	N/A	13.3	33	40	50	N/A	5	N/A
9085626	4	4	5	8	9	M	N/A	5	N/A	33.3	53	60	48	N/A	5	N/A
9065047	5	5	8	8	8	M	N/A	5	N/A	53.3	53	53	55	N/A	5	N/A
9085634	5	5	8	7	6	E	N/A	5	N/A	53.3	47	40	43	N/A	4	N/A
9085637	5	5	7	10	6	M	N/A	5	N/A	46.7	67	40	50	N/A	5	N/A
9065032	8	8	11	10	8	M	N/A	6	N/A	73.3	67	53	48	N/A	4	N/A
9065033	7	7	9	8	8	E	N/A	5	N/A	60.0	53	53	49	N/A	5	N/A
9065036	6	6	8	10	5	M	N/A	6	N/A	53.3	67	33	50	N/A	8	N/A
9085633	9	9	12	7	8	L	N/A	5	N/A	80.0	47	53	46	N/A	4	N/A
9085630	6	6	8	7	8	E	N/A	5	N/A	53.3	47	53	42	N/A	4	N/A
9085628	6	6	7	11	5	M	N/A	6	N/A	46.7	73	33	48	N/A	5	N/A
9085627	8	8	10	7	9	L	N/A	7	N/A	66.7	47	60	55	N/A	6	N/A
9065039	6	6	8	5	6	E	N/A	5	N/A	53.3	33	40	53	N/A	8	N/A
Guard Row																
Guard Row																
9085645	6	6	7	8	7	E	N/A	8	N/A	46.7	53	47	45	N/A	5	N/A
9065048	8	8	10	7	9	M	N/A	6	N/A	66.7	47	60	55	N/A	6	N/A
9065046	8	8	10	11	6	M	N/A	5	N/A	66.7	73	40	58	N/A	6	N/A
9085626	8	8	11	11	9	M	N/A	5	N/A	73.3	73	60	42	N/A	6	N/A
9085633	7	7	9	7	7	M	N/A	4	N/A	60.0	47	47	48	N/A	5	N/A
9085630	7	7	9	9	11	M	N/A	5	N/A	60.0	60	73	45	N/A	4	N/A
9065033	8	8	10	10	8	M	N/A	5	N/A	66.7	67	53	48	N/A	6	N/A
9065036	8	8	11	12	8	E	N/A	7	N/A	73.3	80	53	49	N/A	6	N/A
9085656	6	6	8	8	12	E	N/A	5	N/A	53.3	53	80	50	N/A	3	N/A
9085628	8	8	11	8	9	L	N/A	5	N/A	73.3	53	60	50	N/A	8	N/A
9085637	4	4	5	6	11	L	N/A	6	N/A	33.3	40	73	51	N/A	5	N/A
9065038	5	5	7	7	12	M	N/A	4	N/A	46.7	47	80	50	N/A	7	N/A
9085636	8	8	10	9	9	E	N/A	4	N/A	66.7	60	60	54	N/A	4	N/A
9064986	7	7	9	10	5	L	N/A	5	N/A	60.0	67	33	52	N/A	6	N/A
9065039	7	7	9	6	7	E	N/A	8	N/A	60.0	40	47	51	N/A	4	N/A
9085639	7	7	9	8	7	L	N/A	7	N/A	60.0	53	47	58	N/A	5	N/A
9085627	6	6	8	9	9	L	N/A	4	N/A	53.3	60	60	51	N/A	7	N/A
9085644	5	5	6	6	7	M	N/A	6	N/A	40.0	40	47	47	N/A	4	N/A
9085635	8	8	10	11	9	M	N/A	6	N/A	66.7	73	60	55	N/A	6	N/A
9065047	7	7	9	11	8	E	N/A	4	N/A	60.0	73	53	53	N/A	7	N/A
9065003	8	8	10	9	6	M	N/A	5	N/A	66.7	60	40	54	N/A	5	N/A
9065032	6	6	8	7	12	M	N/A	5	N/A	53.3	47	80	47	N/A	4	N/A
9085638	4	4	5	8	7	M	N/A	7	N/A	33.3	53	47	55	N/A	7	N/A
9085634	8	8	10	9	10	M	N/A	5	N/A	66.7	60	67	40	N/A	3	N/A
Guard Row																

These are seed collections with their accession numbers from the counties in which they originated.

9085630 – Burleson Co., Texas
9065036 – Mills Co., Texas
9085627 – Brazos Co., Texas
9085626 – Hunt Co., Texas
9085656 – Murray Co., Oklahoma
9085633 – Panola Co., Texas
9085639 – Grayson Co., Texas
9065048 – Hunt Co., Texas
9065046 – Limestone Co., Texas
9065003 – Montague Co., Texas
9065047 – Kaufman Co., Texas
9085628 – Brazos Co., Texas
9085644 – Taylor Co., Texas
9065032 – Brazos Co., Texas
9065033 – Hemphill Co., Texas
9065039 – Burnet Co., Texas
9085638 – Grayson Co., Texas
9085645 – Lampasas Co., Texas
9085636 – Parker Co., Texas
9064986 – Gonzales Co., Texas
9085637 – Johnson Co., Texas
9085635 – Nacogdoches Co., Texas
9085634 – Montague Co., Texas
9065038 – Milam Co., Texas

Literature Cited:

Gould, F.W., The Grasses of Texas. Texas A&M University Press, 1975, 205 p.

Study No. : TXPMC-T-0701-BF - Biofuel Study

Objective: There is limited information available on biofuel quality and biomass yield of warm season grasses in relation to effects of weathering in the field throughout the winter. Cultivars and selections of perennial, warm-season grasses will be compared in replicated plots to evaluate the effects of fall, winter, and early spring harvest on dry matter production, biofuel quality and plant adaptation.

Evaluation Factors: The propagules of miscanthus were transplanted on 4/4/2007. The grass seeds of switchgrass, big bluestem and Indiangrass were planted with the recommended seeding rate on 5/15/2007 (Table 7.1). This ground site had rye growing and tilled in 2006 and 2007 prior to establishment.

Location James E. “Bud” Smith Plant Materials Center

Study Leader Brandon Carr, Douglas, J.

Duration 2007 through 2011

Cooperators CNTSC, Fort Worth, TX; ARS, Temple, TX; Elsberry, MOPMC; Mississippi State University, Starkville, MS

Land Use Cropland

Vegetative Practices Not applicable

Resource Concern(s)

Resource	Consideration/Problem
Soil	Erosion
Water	Water Quality
Air	Air Quality

Description Cultivars/selections of warm season grasses will be compared in replicated plots to evaluate the affects of fall, winter and early spring harvest affects on dry matter production and biofuel quality.

Status of Knowledge Dedicated energy crops grown for direct combustion or gasification to generate electricity; ethanol production for transportation fuel; or thermochemical conversion into other by products, require different biofuel quality (McLaughlin et al., 1996). For direct combustion or gasification, biofuel quality needs to have low concentration of alkali metals, especially potassium, low levels of total ash-forming materials, and higher calcium content to mitigate slagging and fouling of conventional boilers (Baxter et al., 1998, Miles et al., 1996).

Conversely, for ethanol fermentation and thermochemical conversion by gasification, the biofuel quality must have low moisture, nitrogen, and ash content and a high concentration of lignocellulose in the biomass (McKendry, 2002).

Time and frequency of harvest play a major role in biofuel quality. Nitrogen and ash content of 'Alamo' switchgrass (*Panicum virgatum* L.), 'Highlander' eastern gamagrass [*Tripsacum dactyloides* (L.) L.] and caucasian bluestem [*Bothriochloa baldhii* (Retz.) S.T. Blake] were reduced in a single fall harvest regime compared to a 2 harvest regime, which consisted of an early summer and early fall harvest in Mississippi (Grabowski et al., 2004). Deferring native grass species for two years in Canada produced the greatest biomass yield with highest cellulosic content for ethanol production as compared to 3 and 4 year deferral period, which seem to favor livestock forage for beef cattle (Jefferson et al., 1999). Exposing standing biomass to natural field weathering has shown to be advantageous for achieving biofuel quality. Delaying switchgrass harvest from the fall to spring in Pennsylvania reduced moisture and mineral content to a level suitable for all biofuel conversion systems (Alder et al., 2006). However, these authors reported lower yields due to loss of leaves and panicles during the winter months, and difficulty during the harvesting operations because of the brittleness of the biomass and lodging from snowfall. In contrast, Boe and Lee (2005) found little to no difference in biomass yield in the northern Great Plains from fall to spring, but clipping height was adjusted from 10 cm in the fall to near ground level in the spring, resulting in higher yields due to heavier stems near the base of the plant.

Experimental Design

Randomized Complete Block, with 4 replications
Plot size –Based on a 40-inch row, 18 ft x 20 ft (7 rows) per plot.

Treatments

Grass species treated as whole plot and harvest dates subplot.

Materials and Methods

Species/cultivars or selections (see list below) from appropriate sources will be planted by seed or propagules (miscanthus) into plots containing 7 rows with 40" spacing and 20 feet long. Interior 5 rows will be clipped for biomass and grab samples for fuel quality estimates and outside rows will be border rows. Plots were planted in April/May 2007. Irrigation will be applied as needed during the establishment year only. Timing and rate of fertilizer amendments will be determined later.

Table 7.1

Cultivars/Selections and species to be tested	Seeding rate(seeds/row ft--#/ac
'Earl' big bluestem	50 PLS/row ft -
'Kanlow' switchgrass	50 PLS/row ft -
'Lometa' Indiangrass	50 PLS/row ft -
9083274 big bluestem (MOPMC)	50 PLS/row ft -
'Alamo' switchgrass	50 PLS/row ft -
Miscanthus (sterile)	3 ft spacing within and between rows

(seeding rate amounts used in 20 ft rows)

Supporting evaluations
Stems or plants per row foot at end of first growing season

Harvest Treatments
A 14' 6" swath will be clipped from the center of each plot beginning at seed maturity (2008-2010) and every six weeks until spring in (2009-2011). See table 7.2 for clipping dates.

Progress or Status: The study was planted in a randomized complete block design with four replications. Clipping was conducted when seed reached 50 % maturity and six weeks thereafter till early spring. The clipped materials were sent to Mississippi State University to Dr. Brian Baldwin to have analyzed for biofuel quality of N, lignin, ADF, NDF, ash (total) caloric value, Ca, Mg, S, P, K, gross energy.

Harvest dates of warm season grass entries at the USDA-NRCS James E. "Bud "Smith Plant Materials Center, Knox City, Texas, 2010-2011.

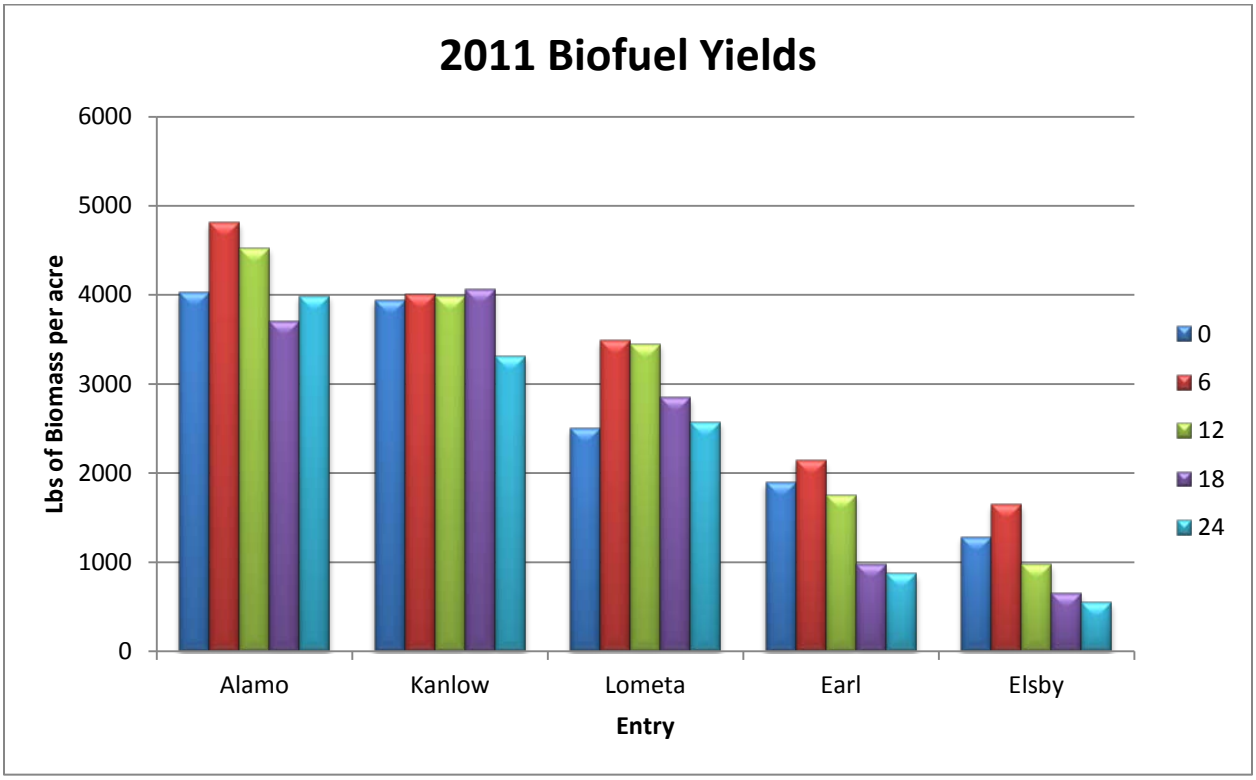
Entry	Harvest Dates				
	1st 1/	2nd	3rd	4th	5th
Alamo switchgrass	05 October	16 November	28 December	08 February	22 March
Kanlow switchgrass	05 October	16 November	28 December	08 February	22 March
Giant miscanthus 2/	N/A	N/A	N/A	N/A	N/A
Earl big bluestem	20 October	01 December	12 January	23 February	06 April
Lometa Indiangrass	20 October	01 December	12 January	23 February	06 April
Elsberry big bluestem	20 October	01 December	12 January	23 February	06 April

1/ - first harvest was made at 50% seed maturation. Subsequent harvests were made approximately every 6 week intervals. 2/ - giant miscanthus does not produce fertile seed; therefore, the harvest date coincides with seed maturity date of the switchgrass cultivars.

Yield of warm season grasses by harvest at the USDA-NRCS James E. "Bud "Smith Plant Materials Center, Knox City, Texas, 2010-2011.

	Warm Season Grasses					
Harvest	Alamo	Kanlow	Miscanthus	Earl	Elsberry	Lometa
	----------lb/acre----------					
1st	4025 b[1/]	3940 ab	N/A	1897 a	1282 a	2499 b
2nd	4810 a	4006 ab	N/A	2139 a	1647 a	3487 a
3rd	4522 ab	3980 ab	N/A	1756 a	671 b	3447 a
4th	3702 b	4056 a	N/A	968 b	645 b	2843 ab
5th	3989 ab	3314 b	N/A	874 b	546 b	2567 b
Mean	4209	3859	N/A	1526	958	2968

1/ - Different letters after the mean yield WITHIN a column indicate significant differences at the 0.05 level (P<0.05).



Study No. : TXPMC-P-0803-RA Legume Trial

Objective: Evaluate three sources of prairie acacia for seed and herbage yield, forage nutritive value, and effect of forage harvest on seed yield. The seed sources are a composite developed at the Kika de la Garza PMC near Kingsville, Texas, Plains Germplasm from the James E. 'Bud' Smith PMC near Knox City, Texas, and STPA05 from Texas AgriLife Research Station in Stephenville, Texas. Two other seed sources will also be evaluated: Crockett Germplasm herbaceous mimosa, *Mimosa strigillosa* and Panicled tick-clover STPTC01, *Desmodium paniculatum* .The evaluation is to select a superior germplasm or selection and move to a cultivar release for the use of native perennial herbaceous legumes for inclusion in forage, rangeland and wildlife seed mix in the southern Great Plains. End-uses include rangeland restoration, native prairie reconstruction, CRP plantings, and wildlife habitat restoration.

Evaluation Factors: The experiment will take place at multiple locations covering latitudes and longitudes (table 9.1) that will define prairie acacia limits of adaptation. Soil amendments and irrigation will not be applied in an effort to evaluate adaptation to local edapho-climatic conditions. At the PMC near Knox City, Texas a test plot of the three prairie acacias, mimosa, and tickclover were planted in the spring of 2008. See table 9.2 for seed source. The following is the plot design.

Plots will be 2 m X 4 m and arranged in a randomized complete block design. There will be 3 replications (3 reps X 5 seed sources X 2 harvest treatments = 30 plots). There will be 5 rows per plot (Hege small plot seeder) on 25 cm spacing. Seed will need to be scarified and then inoculated with specific inoculum and the panicled tick-clover will be inoculated with a general cowpea inoculant. Initial seeding rate will be 30 seeds per row then thinned to 15 plants per row once plants reach a height of 10 cm. If necessary, irrigation may be used to aid establishment up to 10-cm height. Plots will be clean tilled and seeds placed at a 2-cm depth. Past experience has shown prairie acacia to be very sensitive to herbicides and even crop oil (herbicide surfactant). Therefore, only mechanical weed control will be used the first year and Prowl used as a spring pre-emergent the second year before plants re sprout. The experiment will encompass a minimum of two growing seasons (establishment and post-establishment).

The inner $1m^2$ of half of each plot (harvested sub-plot) will be clipped leaving the remaining sub-plot area as a border (which is also cut and discarded). Herbage will be harvested at 10-cm stubble from half the plots whenever 25% of the plants in the inner 3 rows of each entry bloom (as well as just prior to winter regardless of bloom); the different entries may be harvested at different times but all replications of that entry must be harvested at the same time. The mimosa will be clipped at 3-cm height leaving only the stolons. The number of individual plants within the $1m^2$ will be registered where plot cover is incomplete. Plant material from multiple harvests will be batched for each season by plot after registering dry matter weights for individual harvests. Harvested plots will be included in herbage yield and forage nutritive value (N, and Ankom in sacco disappearance be performed at Stephenville; samples dried at 55^o C and ground through a 1-mm screen of a sheer mill).

All plots will be included in the seed production measurement, which will consist of harvesting mature seed before they drop from the plant. Seeds from the harvested and no-harvest sub-plots should be kept separate. Seeds will be collected throughout the season, stored in paper bags in a cooler (to avoid insect damage), batched by year, and sent to Stephenville at the end of each year for cleaning, weighing and counting.

Table 9.1
Locations

Stephenville TX, AgriLife Research Center

Overton TX, AgriLife Research Center

Ardmore OK, The Noble Foundation
Knox City TX, PMC
Homer LA, Louisiana Experiment Station
Nacogdoches TX, PMC
Amarillo TX, AgriLife Research Center
Beeville TX, AgriLife Research Center

Table 9.2

Seed source

Plains Germplasm prairie acacia, *Acacia angustissima,* Knox City PMC Composite

Acacia angustissima, Kingsville PMC composite

Acacia angustissima, Stephenville AgriLife Research line STPA05

Crockett Germplasm herbaceous mimosa, *Mimosa strigillosa*

Panicled tick-clover STPTC01, *Desmodium paniculatum*

Progress or Status: Data was collected in 2011 consisting of survival and plant height. This was the final year for evaluations. Data was sent to Jim Muir at Texas A&M in Stephenville, TX for combination with other locations.

KCPMC-Knox City										
					E					
	D		B		D		A		B	
N	D		E		B		E		A	S
	C		A		C		E		C	
					W					

A	STPA 05
B	Plains PA
C	Kings PA
D	Mimosa
E	Tickclover

Figure 3 Legume Trial 2011

Range	Plot	R/P	Name	% Survival (9-28-10)	% Survival (5-11-11)	Plant Height in. (5-11-11)
1	1	1/1	Kings PA	25%	30%	9
1	2	1/2	STPA 05	50%	40%	8
1	3	1/3	Plains PA	35%	40%	5
2	1	2/1	Tickclover	2%	2%	4
2	2	2/2	Tickclover	5%	2%	3
2	3	2/3	STPA 05	35%	40%	6
3	1	3/1	Kings PA	45%	65%	13
3	2	3/2	Plains PA	40%	70%	7
3	3	3/3	Mimosa	95%	90%	1
4	1	4/1	STPA 05	15%	45%	8
4	2	4/2	Tickclover	5%	1%	5
4	3	4/3	Plains PA	55%	80%	8
5	1	5/1	Kings PA	15%	40%	7
5	2	5/2	Mimosa	90%	85%	2
5	3	5/3	Mimosa	90%	90%	3

Study No. : TXPMC-T-0901-ICST- Arizona Cottontop

2011 Interim report of the evaluation of three Arizona cottontop selections in two common gardens
November 2011

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Abstract

Arizona cottontop, *Digitaria californica*, is a native warm season grass found from southern Colorado to Texas, Arizona, and northern Mexico. The species responds quickly to spring and summer rains thereby providing good quality early forage when it is green (Arizona Range Grasses 1960). The purpose of this study was to document performance differences of the 3 NRCS selections in common gardens located at sites representing diverse western habitats.

Results from the Texas and Arizona trials show no significant (P=<.05) differences in biomass yields at either location in 2010 or 2011. At the Texas PMC PMT-389 produced the most biomass (1.8 t/acre) in 2010; in 2011 PMT-389 produced 0.6 t/acre, while Loetta and La Salle produced 0.6 t/acre and 0.5 t/acre respectively. At the Arizona PMC La Salle produced the most biomass (2.3 t/acre) in 2010 and Loetta produced the most biomass (3.2 t/acre) in 2011. Loetta produced significantly (P=<.05) more seed (235 lb/acre) than La Salle in 2010;and significantly more seed (233 lb/acre) than both La Salle Germplasm and PMT-389 in 2011. Arizona data was not statistically analyzed, however, Loetta also was the best producer in 2011. Seed production at the Texas PMC far exceeded production at the Arizona PMC among all accessions. In 2011, Loetta produced 233 lb seed per acre at Texas and 98 lb/acre at the Arizona site. The large yield difference is likely due to number of harvests and fertility.

Introduction

Arizona cottontop, *Digitaria californica*, is a native warm season grass found from southern Colorado to Texas, Arizona, and northern Mexico. This species can be found in the oak woodland, chaparral, and semidesert grassland types, between 300 and 1,800 m.

Arizona cottontop is a commonly found growing with gramas (*Bouteloua spp*.), three awns (*Aristida spp.*) , and beardgrass (*Andropogon barbinodis*) and typically makes up 2-5% of the total ground cover (USDA, USFS. 1988). This species responds quickly to spring and summer rains thereby providing good quality early forage when it is green. The species is both self- and cross- pollinated, with selfing the predominant methodology; seed development is indeterminate throughout the summer period (Pitman, 2004).

The purpose of this study is to document performance differences of the 3 NRCS selections in common gardens located at sites representing diverse western habitats.

Materials and Methods

Included in this trial was accession PMT-389, a single source collection from Culberson county, Texas, informally released to commercial industry in the 1970's, La Salle Germplasm (Smith 2009), a 12 source composite developed for use in southern Texas, and 'Loetta'(USDA1, NRCS) a single source cultivar released for use in southeastern Arizona.

The plots consist of four, 50 ft long rows at the Texas location; the Arizona location has 2 50 ft long rows. Rows are approximately 40 inches apart and Seeded at a rate of approximately 20 seed/linear foot. Weeds were controlled using mechanical and chemical methods. Texas and Arizona plots were fertilized in the spring of 2010 and 2011 at 50lbs of actual N per acre and 20 lbs actual N per acre respectively. Plots at Texas and Arizona received supplemental irrigation in the establishment year (2010); the Arizona plots received supplemental irrigation, estimated at 1.6 acre feet) in the 2011 year, the Texas plots did not. The following data was collected:

1st year – visual observations including percent establishment and percent stand at the beginning of the season and percent survival at end of season.

2nd year – date dormancy ends (if it goes dormant); date of flowering; date of harvest; percent stand (30 days after dormancy breaks); forage (fresh and dry weight) to be determined from 1 linear meter clipped (to ~4" height) from designated rows; seed production (lbs) from each plot (seed to be harvested with FlailVac).

3nd year – date dormancy ends (if it goes dormant); date of flowering; date of harvest; percent stand (30 days after dormancy breaks); forage (fresh and dry weight) to be determined from 1 linear meter clipped (to ~4" height) from designated rows; seed production (lbs) from each plot (seed to be harvested with FlailVac).

Results and Discussion

Plots were evaluated in 2010 and 2011 for various parameters including biomass produced, stand, seed production, date when dormancy ended, and flowering date. At the Texas PMC plants began spring growth mid April (April 14) in 2010 and early April (April 4) in 2011; in Arizona spring growth began in early March in 2010 and 2011.

Stands were ranked 100% in 2010 and 2011 in Arizona while Texas ranked the average stand as being 75% in 2010 and 70% in 2011. First flowering date was uniform among all entries and was similar in both years with Texas plots first flowering end of May-beginning of June, while Arizona first flowering dates were noted as occurring mid-April in 2010 and early May 2011.

Texas harvested seed twice mid-June and mid-July 2010 and 2011; Arizona had a single harvest on May 26, 2011. At the Texas PMC Loetta had significantly (P=<.05) higher seed yield (233 lb/ac) than PMT-389 and La Salle in 2011; in 2010 Loetta was significantly higher (235 lb/ac) than La Salle (173 lb/ac) (Table 1). Arizona seed yields were not statistically analyzed; however, Loetta was the best seed producer in 2011 at 98 lb/ac, while LaSalle yielded 90 lbs/ac, and PMT-389 82 lb/acre. The large difference in seed yield between the Texas and Arizona sites likely due to number of harvests: Arizona's one versus two at Texas; and fertility with Texas having applied 50 lbs actual N per acre while Arizona applied 20 lbs. actual N per acre. Fertilizer was applied as a single application at both sites and in both 2010 and 2011 growing seasons.

Table 1. Mean seed yields of La Salle Germplasm, 'Loetta', and PMT-389 Arizona cottontop accessions at Knox City, Texas Plant Materials Center 2010-2011.

Accession	2010	2011	Mean Yield
	----------lb/acre----------		
Loetta	235	233	234
PMT-389	207	184	196
La Salle	173	153	163
LSD (P=<.05)	43	43	

No significant (P=<.05) differences in biomass yield (Table 2.) were found at either location in 2010 or 2011. Arizona biomass yields in 2011 (3.0 t/ac) were higher than 2010 (1.9 t/ac). Texas 2011 biomass yields (0.6 t/ac) were substantially less than 2010 (1.5 t/ac). Biomass yield appears related to total moisture the crops received through natural rain or supplemental irrigation (Table 3). In 2011 Texas received approximately 5.1 inches of moisture during the growing season which yielded an average of 0.6 t/ac among all entries whereas in 2010, during the same growing period 7.5 inches of moisture was received which yielded an average of 1.5 t/ac among all entries.

Table 2. Mean biomass yield of La Salle Germplasm, 'Loetta', and PMT-389 Arizona cottontop accessions at the Tucson, Arizona; and Knox City, Texas Plant Materials Centers 2010-2011.

Accession	Tucson, AZ PMC	Knox City, TX PMC	Mean Yield

	2010	2011	2010	2011	2010	2011
	----------t/acre----------					
La Salle	2.3	3.1	1.2	0.5	1.8	1.8
Loetta	1.8	3.2	1.5	0.6	1.6	1.9
PMT-389	1.7	2.8	1.8	0.6	1.8	1.7
LSD (P=<.05)	NS	NS	NS	NS	NS	NS

Arizona plots received approximately 7.2 inches of moisture during its March thru August growing season and yielded an average of 1.9 t/ac biomass in 2010; in 2011 the plots received approximately 13.9 inches of moisture which yielded an average of 3.0 t/ac biomass. Although biomass yield appears closely related to available moisture seed yield was not affected.

Table 3. Average monthly precipitation during growing season at the Tucson, Arizona and Knox City, Texas Plant Material Centers in 2010-2011.

Month	Tucson, AZ PMC				Knox City, TX PMC			
	2010 rainfall	2010 Irrigation*	2011 rainfall	2011 irrigation*	2010 rainfall	2010 Irrigation*	2011 rainfall	2011 irrigation*
	----------inches----------							
Jan	1.8	0.0	0.0	0.0	3.1	0.0	0.1	0.0
Feb	1.9	0.0	0.3	2.0	2.8	0.0	0.8	0.0
Mar	0.4	2.0	0.1	2.0	1.7	0.0	0.2	0.0
Apr	0.1	0.0	0.0	0.0	4.7	0.0	0.0	4.0
May	0.0	0.0	0.4	4.0	2.8	0.0	1.1	0.0
June	0.0	2.0	0.0	4.0	1.5	0.0	0.2	4.0
July	0.7	2.0	1.4	2.0	10.8	0.0	0.0	4.0
Aug	1.5	2.0	0.8	4.0	1.2	0.0	0.0	4.0
Sep	0.1	0.0	2.6	0.0	6.5	0.0	0.3	4.0
Oct	0.3	0.0	-	-	1.0	0.0	2.8	0.0
Nov	0.0	0.0	-	-	0.4	0.0	-	-
Dec	0.5	0.0	-	-	0.1	0.0	-	-
Total	7.3	8.0	5.6	18.0	36.4	0.0	5.4	30.0

*= individual irrigation applications are estimates.
0 = growing season prior to harvest of crop biomass

References:

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USDA, USFS. 1988. Range Plant Handbook. p 203-204. Dover Publications Inc. , New York. Reprinted , originally issued by the USFS 1937.

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Study No.: TXPMC-T-0903-BF ICST- Biomass Study

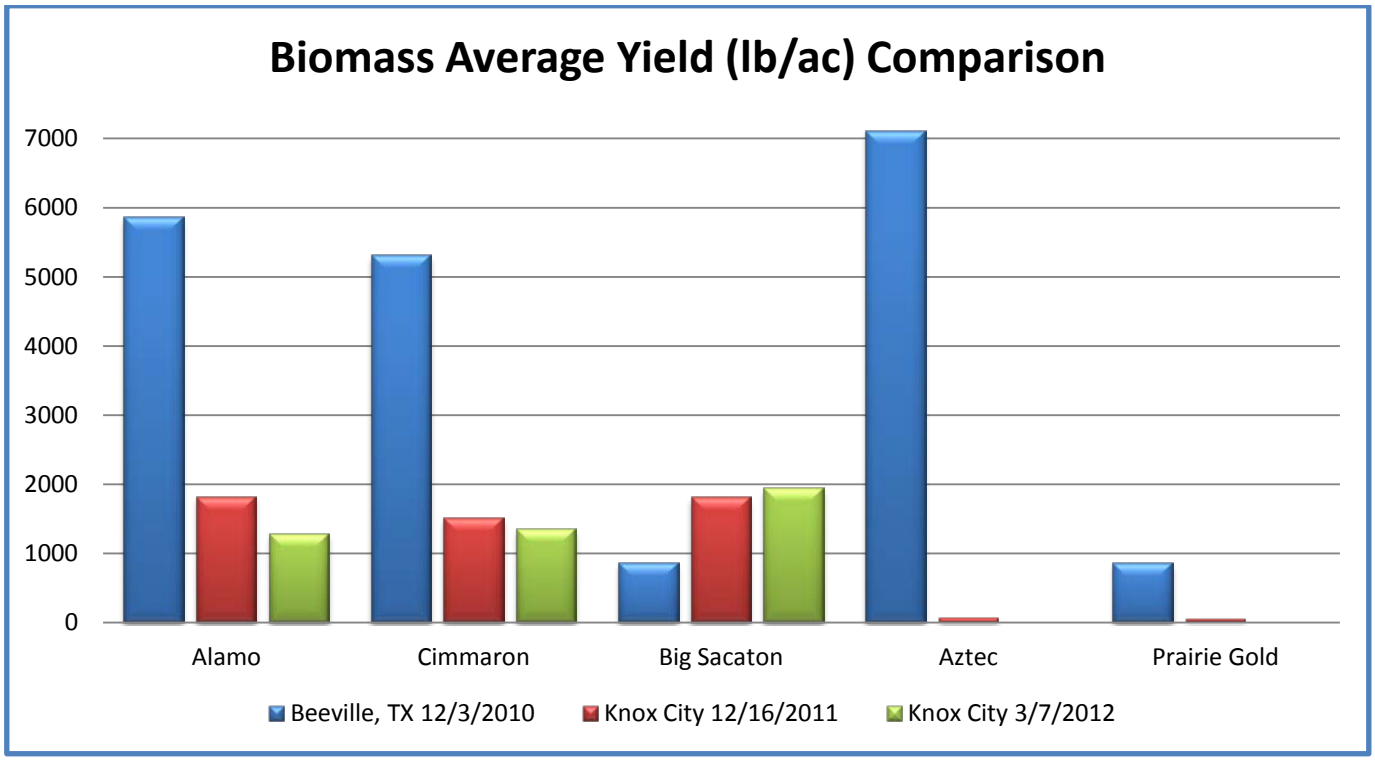
Objective: Switchgrass has been designated as one of the leading biomass energy crops for production, gasification, and liquid field production. The objective of this study is to compare biomass yield and fuel quality of warm season grasses to Maximilian sunflower as dedicated energy crops.

Evaluation Factors: A biomass harvest will be taken four weeks after the first frost by clipping a 14'5" sample. A grab sample will be taken and dried at 55'C for 24 hours. Then yield and % dry matter can be calculated. 100 grams of dried sample will be sent to Agri-Life in Stephenville, TX for chemical analysis.

Progress or Status: Planting was attempted on May 22, 2009 and again on June 24, 2009. In both cases, hot, dry weather made establishment difficult and new seedlings dried out and died. It was decided to postpone this study until 2010 when plants would be started in the greenhouse and transplanted into the field. Plots were transplanted on June 21, 2010. Observations and data collection began in 2011.

Plot Layout
Transplanted June 21, 2010

Rep 4	**Alamo**	**Aztec**	**Prairie Gold**	**Cimarron**	**Big Sacaton**	**Rep 4**
Rep 3	**Aztec**	**Cimarron**	**Big Sacaton**	**Prairie Gold**	**Alamo**	**Rep 3**
Rep 2	**Prairie Gold**	**Alamo**	**Cimarron**	**Big Sacaton**	**Aztec**	**Rep 2**
Rep 1	**Cimarron**	**Big Sacaton**	**Alamo**	**Aztec**	**Prairie Gold**	**Rep 1**



Study No. : TXPMC-P-0904-RA Evaluation of vine-mesquite

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide for stabilization of soils that have high erosion potential.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Eight-seven collections were submitted to the PMC along with twenty-six accessions the South Texas PMC, and thirty found in the PMC seed vault. These collections were started in the greenhouse and transplanted into rod rows in "N" block in the spring of 2010 and 2011. Currently, there are eighty-three individual rod rows growing for evaluation. These evaluations will begin in the spring of 2012.

Scientific Name: *Panicum obtusum.*
Common Name: vine mesquite

Morphological Characteristics:

Habit- native, warm-season perennial grass, 8-24 inches tall; initiates growth in April to May; reproduces by seed, tillers, stolons, and rhizomes.
Inflorescence – panicle 1-1/4 to 6 inches long; 3/16 – ½ inch wide; branches erect, distant, usually unbranched
Spikelets – 2 florets, spikelet obovate, 1/8 – 5/32 inches long, glabrous, brown at maturity; upper floret indurate, glabrous, brownish
Awns – glumes, lemmas, and paleas awnless
Glumes – first and second glume nearly as long as spikelet, apex of both obtuse
Culms – erect, 8-24 inches tall, from a knotty or rhizomatous or stoloniferous base
Leaves – sheaths rounded with glandular papilla-based hairs; collar hairy, sometimes pilose on margins; blades firm, 2-8 inches long, 1/16 – 5/16 in wide
Ligules – membranous, 1/32 – 1/16 inch long, apex erose
Other – The stolons of this grass may grow several feet long and have swollen woolly nodes. The brownish, round seeds lie close to the main seed stem forming a narrow seedhead. Often one leaf clings closely to the seedhead.
Habitat and Range: sandy or gravelly or clayey soils in areas of moisture accumulation. Texas distribution: throughout the state except MLRA 133B – Western Coastal Plain

Conservation Use:

Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 342 Critical Area Planting; 550 Range Planting; 647 Early Successional Habitat Development/Management; 391 Riparian Herbaceous Cover; 327 Conservation Cover.

2010 Vine Mesquite Rod Rows

15	B							B	15
14	B	9107768	9107769	9107777	9107781			B	14
13	B	9107765	9107762	9107761	9093159		9107783	B	13
12	B	9093138	9093142	9093143	9093044	9093154	9093152	B	12
11	B	9093134	9093131	9093129	9093127		9093149	B	11
10	B	9093096	9093095	9093106	9093108	9093124	9093117	B	10
9	B	9093097	9093105	9093094	9093085	9093110	9093111	B	9
8	B	9093072	9093074	9093077	9093079	9093084	9093082	B	8
7	B	9093051	9093053	9093054	9093055	9093080	9093081	B	7
6	B	9093050	9093047	9093048	9093049	9093056	9093057	B	6
5	B	9086228	9086230	9086246	9086265	9093046	9093045	B	5
4	B	9086227	9085239	9085304	9085303	9089037	9090470	B	4
3	B	9085267	9085268	9085269	9085275	9085293	9085292	B	3
2	B	9085251	9085250	9085249	9085244	9085238	9085232	B	2
1	B	9076969	9076970	9076972	9076973	9085226	9085227	B	1

2011 Vine Mesquite Rod Rows

22	9093053		9093142		T 4562		22
21	9093051		9093138		PMT 4830		21
20	9093050		9093131		PMT 4702		20
19	9093049		9093129		9107856		19
18	9093048		9093127		9107790		18
17	9090470		9093124		9107788		17
16	9089037		9093121		9107787		16
15	9086230		9093118		9107786		15
14	9086228		9093110		9107785		14
13	9086227		9093106		9107781		13
12	9085293		9093099		9107768		12
11	9085292		9093103		9107766		11
10	9085275		9093094		9107765		10
9	B		9093089		9107762		9
8	B		B		9093158		8
7	9085267		9093082		9093157		7
6	9085250		9093081		9093154		6
5	9085249		9093080		9093152		5
4	9085239		9093075		9093149		4
3	9085232		9093074		9093145		3
2	9076973		9093057		9093144		2
1	9076970		9093055		9093143		1

Study No.: TXPMC-P-0905 Evaluation of Blue Grama

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide for stabilization of soils that have high erosion potential.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance

Progress or Status: Forty-six collections were submitted to the PMC. These collections were started in the greenhouse and transplanted into rod rows located in "N" block in the spring of 2010 and 2011. Currently, there are twenty-two individual rod rows growing for evaluation. These evaluations will begin in the spring of 2012.

Scientific Name: *Bouteloua gracilis*
Common Name: Blue Grama

Morphological Characteristics:

-native, perennial, warm season bunchgrass that grows 6-26 inches tall
-found on dry slopes, plains, prairies, and foothills of most western states
-leaf blade is thin, flat, or infolded, .5-2 mm broad
-foliage color is gray-green
-flower color is yellow
-seed heads have 1-3 primary unilateral or comb-like branches 1.5-3 cm long
-branches have 40-130 tightly packed spikellets 4-7 mm long
-flower clusters are initially straight and green in color, but eventually dry and turn to a pale, blonde color
-adapted to a wide variety of soil types

Conservation Use: The James E. "Bud" Smith plant materials center has identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Planting; 562 Recreation Area Improvement; 550 Range Planting; 512 Pasture and Hay Planting; 327 Conservation Cover. The planting of blue grama can provide excellent food and cover benefits for wildlife and livestock, as well as conserve our soil.

2010 Blue Grama Rod Rows

B							B
B			9107767	9093155	9093151	9093137	B
B	9093126	9093128	9093130	9093132	9093135	9093136	B
B	9093123	9093120	9093112	9093107	9093102	9093076	B
B							B

2011 Blue Grama Rod Rows

9093130	9107789
9093128	9107770
9093126	9107767
9093123	9093155
9093120	9093153
9093116	9093112
9093151	9093150
9093102	9093137
9093076	9093136
9085788	9093135
439880	9093132

Study No. : TXPMC-P-0907-RA Evaluation of Three-flower melic

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Nineteen collections of this species have been submitted to the PMC and will request another year of collection. Current collections were planted in greenhouse and transplanted but did not survive the summer. Accessions will be started again in the greenhouse in 2012 and another attempt for establishment will be made.

Scientific name: *Melica nitens*
Common name: Three-flower melicgrass

Morphological Characteristics:

Habit - Three-flower melicgrass is a perennial, cool season bunchgrass which grows 24 - 36 inches tall. This grass reproduces by seed mostly April to June.
Leaves – leaf blades may be smooth or with hairs, flat, 3 - 10 mm broad.
Inflorescence - panicle is mostly 10 – 26 cm long with lower branches usually compound, spreading or ascending.
Spikelets – much longer than broad (8 – 15 mm long)
Habitat and Range – Three-flower melicgrass is found from Pennsylvania to Iowa and Kansas, and south to Virginia, Arkansas, Oklahoma and Texas. In Texas, it is most often found in the Edwards Plateau and the North Central regions, but can be found west to the Trans-Pecos and East to the western portion of East Texas. It grows in open woods, on moist canyon slopes, in canyon bottoms, on rocky grasslands, as well as along stream banks and along roadsides. Three-flower melicgrass tends to prefer partial shade and calcareous or sandy loam soils.
Other - Three-flower melicgrass requires partial shade and medium amounts of water. This bunchgrass is excellent for wildlife and the enhancement for water quality.

Conservation Use:

The James E. “Bud” Smith Plant Materials Center has identified this plant as having potential benefits to the following NRCS conservation practice standards: 391 Riparian Forest Buffer, 645 Upland Wildlife Habitat Management, 512 Pasture and Hay Planting, 342 Critical Area Planting and 550 Range Seeding.

Study No. : TXPMC-P-0908-RA Evaluation of showy menodora

Objective: Collection and evaluation for a superior forb plant for use as an improvement of range and pastureland, and provide food such as deer browse and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Currently only six collections of this species have been submitted to the PMC. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Menodora longiflora.*
Common Name: showy menodora

Morphological Characteristics:

Habit- perennial, many-branched half-shrub, up to 18 inches high with woody base; seeds, borne four to a capsule, mature and shatter throughout the summer and early fall.
Leaves – mostly opposite but upper leaves sometimes alternate, usually entire but some lower leaves 2 or 3 lobed; up to 2 inches long.
Inflorescence – panicle 1-1/4 to 6 inches long; 3/16 – ½ inch wide; branches erect, distant, usually unbranched
Flowers – yellow with tube up to 2 inches long; 5-lobed; about 1 – 1-1/4 inches across; blooms from June to September.
Habitat and Range – dry, rocky hillsides, usually limestone but also igneous, canyons and ledges along streams in the Edwards Plateau and Trans-Pecos, southeastern New Mexico and Mexico from 1100’ to 6600’
Other – This is a species readily eaten by goats, sheep, and deer. It has been browsed out of some of its former area, but because of rocky habitat, it has persisted.

Conservation Use:

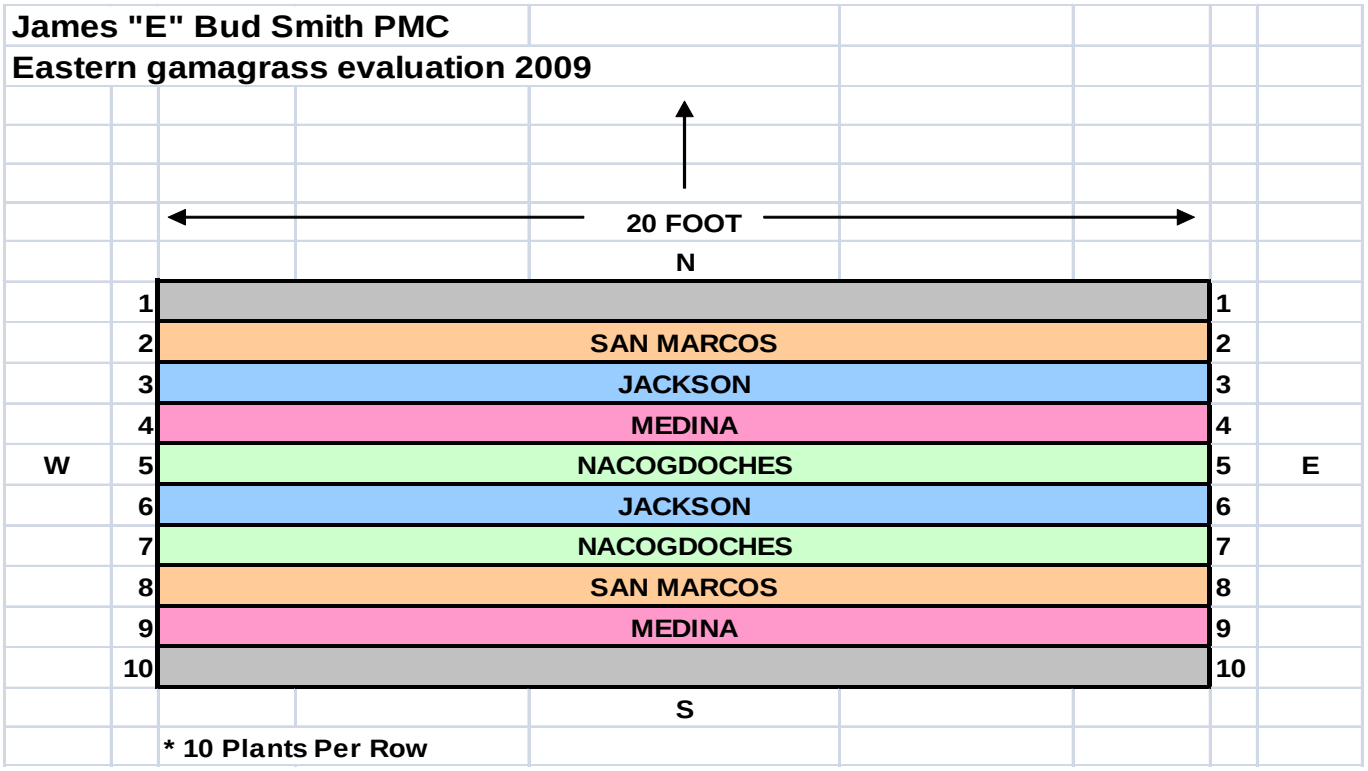
Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 342 Critical Area Planting; 550 Range Planting; 647 Early Successional Habitat Development/Management; 645 Upland Wildlife Habitat Management and 327 Conservation Cover.

Study No.: TXPMC-T-0909-PA ICST- Eastern Gamagrass

Objective: The objective of this study is to determine differences between four different releases of eastern gamagrass. The different releases are: San Marcos, Jackson, Medina, and Nacogdoches.

Evaluation Factors: Plant measurements will be taken on stems, leaves, heads, seed, to determine differences from one release to another.

Progress or Status: Plots were established this year. Plot layout is shown in map below. Limited moisture prevented normal growing conditions needed to collect accurate data on plant growth and development. Plots were maintained with the intent to collect data beginning spring 2012.



Study No.: TXPMC-P-1001-RA Evaluate Original Accessions of Prairie Acacia for Possible Tested or Cultivar Release

Objective: The objective of this study is to evaluate five accessions from the bulk of Plains Germplasm in order to possibly release a superior cultivar or germplasm.

Evaluation Factors: Replicated trials will be conducted to statistically select superior prairie acacia for conservation use.

Progress or Status: Five lines were selected based on visual selection in 2010. Seed was harvested from these lines and was planted in greenhouse and transplanted in rod rows in the spring of 2011. Beginning in the spring of 2012, observations and data collection will begin.

Selected Lines:

9064928	Lee County, TX
9064965	Haskell County, TX
9049617	Crockett County, TX
9064922	Coke County, TX
9064924	Grimes County, TX

9064922	**9064924**	**9064928**	**9049617**	**9064965**
9064924	**9064928**	**9049617**	**9064965**	**9064922**
9049617	**9064965**	**9062922**	**9062924**	**9064928**

Study No.: TXPMC-T-1002-RA Sampling Protocol for Established and Newly Planted Perennial Grasses for Vegetative Barriers

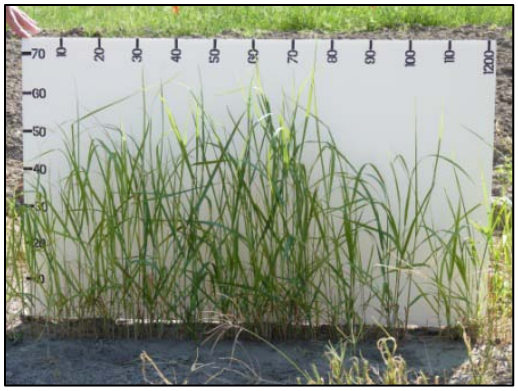
Established Barriers

Data will be collected from replicated, single rows of perennial grasses representing tall and mid statute growth habits.

Porosity and plant architectural measurements as describe below will be collected on established perennial grasses at the following growth stages:

- Dormant - March
- stem elongation (prior to boot)
- flowering to seed maturity

A. Optical Porosity - Photography



1 Select a typical or average section of the vegetative barrier. A typical section is about 1 meter for herbaceous (grasses) and 3-5 full plants for larger shrubs and trees. The selected section should be of healthy plants with a typical or desired population density.

2 Use a white backdrop with measurements to provide a scale (e.g. 10 cm increments (see example below). Take the photo perpendicular to the midpoint of the barrier (both vertical and horizontal midpoint). The goal is to frame the picture so that whole plants (inflorescence and base of the plant) are captured in front of the board (see examples below). Avoid shadows on the backdrop as this may give erroneous porosity measurements (*Try to get as much contrast between background and the plant as possible – this may require a dark backdrop for light colored vegetative material*). If no backdrop is available or the plants are too big for the backdrop, shoot the photograph from as near the ground as possible (i.e. have the camera as close to the ground as possible) using the sky as a background. Remove any plants or other obstructions between the subject plants and the camera. Take three replicates of different sections of the barrier. **Flag the location of each photograph so that the same section of plants can be used in subsequent photographs.**

3 **Add Properties to Pictures.** Other pertinent information should also be recorded including the date photo was taken, species, average height of the barrier, and the date the barrier was planted.

B. Plant Architecture – Quantitative Measurements (measure the plant in the following order to maximize data collection)

1. **Observe the lodging/stiffness at <u>DORMANT GROWTH STAGE ONLY</u>** using the scale of 1 = Upright; 3 = lodge to an angle greater than 45° from vertical position; 5 = horizontally touching the soil surface.
2. **Plant height** will be taken **(at all stages)** at multiple locations in the row by measuring from the soil surface to the **<u>natural height</u>** of the plant. Report the measurement for each location measured along the barrier, respectively (e.g. 12, 13, 11 inches…). Record the raw data (no average height).
3. **Stem diameter** will be determined **(at all stages)** by measuring stem diameter of 10-15 randomly sampled stems from along the length of the row (avoid collecting data from stems on ends of the row) at 2 intervals such as 6 and 18 inches above the soil surface for a perennial grass such as switchgrass. Report the diameter of the stem at each interval along the stem (e.g. 6 inches - 0.25, 0.24, 0.23, 0.26……18 inches - 0.16, 0.15, 0.15, 0.14….. Record the raw data (no average stem diameter) (**<u>note</u>**: *digital calipers works best for collecting this data*).
4. **Dry matter yield** will be determined by harvesting biomass from a given row length at a height of 6 inches.

   <u>Stem Elongation Sampling</u> - When collecting samples for the stem elongation growth stage, it is critical to partition the sample into *previous year's residue* and *current year's growth*. Weigh both vegetative components separately.

   Collect approximately 250 gram sample of *previous year's* and *current year's growth* and dry in a forced air drier at 60° C for 24 hours. Determine dry matter and calculate dry matter yield and report in lb/acre.

   Report the yield of each vegetative component by replication (e.g. rep 1 *previous year's growth* -1000 lb/acre; rep 1 *current year's growth* -1398 lb/acre.
5. **Stems/plant** will be determined by counting the number of stems from 3 to 4 plants in the row that are of average size**.** This measurement is made annually **at stem elongation**. Report the raw data.
6. **Plants/row** will be determined by counting the number of plants in a given length of row at multiple locations and extrapolating to number of plants/acre. Report the raw data.

Objective: Collect raw measurements on various perennial grasses used as vegetative barriers in order to develop a conservation planning tool.

Progress or Status: Data was collected at the stem elongation stage from various measurements taken such as plant height, stem diameter, stems per plant, leaf to stem ratio, and yield. No other measurements were taken due to limited rainfall and no seed production. Data will continue to be gathered in the spring of 2012. A second block will also be planted to gather data beginning with seedlings through dormant stages.

Table 2 Average Plant Measurements for Established Barriers

Entry	plt ht (in)	6"dia (mm)	18"dia (mm)	plot wt	prev. year	sam grn wt	sam dry wt	stem grn wt	stem dry wt	leaf grn wt	leaf dry wt	plts/3 ft row	leaf to stem ratio	Pct dry weight	% H2O	Yield lb/a	Prev Year Yield	Total Yield
Alamo	16.9	4.1	2.8	0.26	0.02	69.3	46.2	20.0	6.5	21.4	9.0	3.5	1.61	69.4	30.6	2796	169	2965
Sel. 75	10.7	2.6	2.1	0.23	0.03	67.7	38.0	10.8	4.5	9.4	3.8	4.25	0.94	58.1	41.9	2077	244	2322
Up. S.G	11.4	2.1	1.8	0.09	0.02	22.8	15.9	2	0.575	5.4	2.425	3.75	4.49	66.3	33.7	1020	210	1230

Study No.: TXPMC-P-1003-PA Initial Evaluation of Texas Cupgrass (Eriochloa sericea)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Currently forty-seven collections of this species have been submitted to the PMC and will request another year of collection. Currently, there are sixteen individual rod rows growing for evaluation. These evaluations will begin in the spring of 2012.
Evaluations will begin in the spring of 2012.

Scientific Name: *Eriochloa sericea*
Common Name: Texas Cupgrass

Morphological Characteristics:

- native, an erect perennial bunchgrass
- warm season
- can be found in North Central Texas, the eastern portion of the Edward's Plateau and Rolling Plains, and the Rio Grande Plains
- reproduces by tillers and seed
- seed presses tightly against the seed head and appears to sit in a small cup
- leaves are 1/16 to 1/8 inch wide and 4 to 11 inches in length
- plant height 12-48 inches
- blooming occurs from April through October
- stem of seed head will have a zig-zag appearance after seed falls
- usually grows on a clay or clay-loam soils in prairies or roadsides

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 327 Conservation Cover; 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement; 550 Range Planting; 512 Pasture and Hay Planting; 332 Contour Buffer Strips; 393 Filter Strips; and 528 Prescribed Grazing. The planting of Texas cupgrass can provide excellent food and cover benefits for wildlife and livestock as well as help conserve our soil. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

2011 Texas Cupgrass Rod Rows

T 43254	T 53739
T 43231	T 53732
T 43230	T 53730
T 43229	T 45759
T 38705	T 43298
9107829	T 43295
9049270	T 43294
9049269	T 43290

Study No.: TXPMC-P-1004-WL Initial Evaluation of Prairie Bundleflower (Desmanthus leptolobus)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food such as deer browse and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Currently only three collections of this species have been submitted to the PMC. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Desmanthus leptolobus*
Common Name: Prairie Bundleflower

Morphological Characteristics:

- native, multi-stemmed, spreading legume
- warm season perennial
- stems are 2-10mm in length and are prostrate to suberect
- petioles are 2-5mm long
- leaflets are narrowly elliptic or linear
- distribution is in post oak savannah, blackland prairies, cross timbers and prairies, Edwards plateau, and rolling plains
- found on prairies and open ground, rocky and clayey areas
- fruit is long, narrow, and bunched on the end of the stems
- flowering occurs from late May through June

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement; 550 Range Planting; 512 Pasture and Hay Planting. The planting of Indian ricegrass can provide excellent food and cover benefits for wildlife and livestock as well as help conserve our soil. In western portion of Texas there is a need for locally adapted native (ecotypic) plant materials for use in restoration projects. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

Study No.: TXPMC-P-1005-PA Initial Evaluation of Western Wheatgrass (Pascopyrum smithii)

Objective: Collection and evaluation for a superior cool season grass for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Currently twenty-seven collections of this species have been submitted to the PMC. Currently, there are twenty-eight individual rod rows growing for evaluation. These evaluations will begin in the spring of 2012.

Scientific Name: *Pascopyrum smithii*
Common Name: Western Wheatgrass

Morphological Characteristics:

- native, densely colonizing turf grass
- cool season
- reproduction is both sexually, with seeds, and asexually, from rhizomes
- plant height 12-24 inches
- leaves have bluish-green color, 4-10 inches long, and 1/8 to ¼ inch wide
- upper surface of leaves is rough to the touch due to the ribbed surface
- seedhead is a dense, narrow spike ranging from 2-6 inches in length
- spikelets are 3/8 to ¾ inch long and overlap
- ligule is short, membranous, notched or miutely fringed
- found on moist to dry prairies, waste areas, ditch banks, and roadsides
- grows abundantly in areas subject to seasonal poor drainage and during years of heavy rainfall
- dormant in the summer, but plants start growth when daytime temperatures reach 53-55F

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement; 550 Range Planting; 512 Pasture and Hay Planting. The planting of Western wheatgrass can provide excellent erosion control for highly erodible lands. It also provides food and cover benefits for wildlife and is readily grazed by livestock. In western portion of Texas there is a need for locally adapted native (ecotypic) cool season plant materials for use in restoration projects. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

2011 Western Wheatgrass Rod Rows

9107821	Rosana
9107820	Arriba
9107818	Barton
9107817	9107850
9107816	9107848
9107815	9107840
9107813	9107834
9107812	9107831
9107811	9107830
9107809	9107828
9107806	9107827
9107805	9107824
9107804	9107823
432400	9107822

Study No.: TXPMC-P-1006-RA Initial Evaluation of Pink Smartweed (Polygonum pensylvanicum)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Currently eighteen collections of this species have been submitted to the PMC. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Polygonum pensylvanicum*
Common Name: Pink Smartweed

Morphological Characteristics:

- native, annual
- warm season
- native habitat includes ponds, quiet streams, canals, ditches and swamps
- reproduces each year from seed
- erect growing plant that reaches heights of 48 inches
- leaves are green in color and have a pointed or oblong shape
- leaves grow about 6 inches long and 1 inch wide
- flowers are pink and white in color, and will bloom from late spring to late fall
- flowers grow in spike-like clusters 2 inches long and ½ inch wide
- seeds are round with a shiny black color

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement. The planting of pink smartweed can provide food and cover for many birds and small mammals. The forage is browsed by deer. In western portion of Texas there is a need for locally adapted native (ecotypic) plant materials for use in restoration projects. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

Study No.: TXPMC-P-1007-CR Initial Evaluation of Knotgrass (Paspalum distichum)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Currently two collections of this species have been submitted to the PMC. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Paspalum distichum*
Common Name: Knotgrass

Morphological Characteristics:

- native, perennial
- warm season
- grows in clumps or creeping along soil
- stands tend to be short lived and reproduces from rhizomes, stolons, and seed
- stems grow along the soil from 6-72 inches in length
- at nodes on the stem, roots and flowering stems emerge
- plant can cover a circle of a yard or more in diameter
- leaves are narrow, lance-shaped, or oval ½ to 1 ½ inches long
- flower stems will grow up to 18 inches tall
- flowers are 1/8 inch long and grow in clusters of two to three per stem
- color of flowers range from usually pink to red, green, or dull white
- seeds are oval to elongated, light colored, and taper to a point
- adapted to both wet and well-drained areas, frequently found in meadows, marshes, and ditches
- can tolerate high salinity and waterlogged environments
- most active in spring, summer, and fall with most seed production in late summer and fall

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 327-Conservation Cover; 342-Critical Area Planting; 386-Field Border; 390-Riparian Herbaceous Cover; 393-Filter Strips; 512-Pasture and Hay Planting; 550-Range Planting; 560-Access Road; 562-Recreation Area Improvement; 643-Restoration and Management of Rare and Declining Habitats; 644-Wetland Wildlife Habitat Management; 647-Early Successional Habitat Development/Management; 656-Constructed Wetland; 657-Wetland Restoration; 658-Wetland Creation; 659-Wetland Enhancement. The planting of Knotgrass can provide excellent food and cover benefits for wildlife and livestock as well as help conserve our soil. In western portion of Texas there is a need for locally adapted native (ecotypic) plant materials for use in restoration projects. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

Study No.: TXPMC-T-1101-PA Evaluating Warm Season Grasses for Winter Stockpiling

Objective: Limited information is available on the quality and quantity of native pastures throughout the winter months. Cultivars/selections of warm season grasses will be compared in replicated plots to evaluate the nutritional value and yield potential from the fall through winter months. A comparison will also be made to determine nutritional value and tonnage of winter pastures that are grazed with pastures that are not grazed.

Evaluation Factors:. Evaluations will be made between each species as it progresses through the winter months. Biomass and nutritional values will be compared at six different dates to determine the amount and quality of grazing a pasture or rangeland as opposed to baling and storing in a barn. Grass plots will be divided into halves with one half being mowed down to six inches around the first of July. This will simulate a pasture that has been grazed throughout the spring and summer months, but rested in order to provide recovery for winter grazing. A biomass sample will be taken at this time simply to determine the amount of yield at this time of the year.

Progress or Status: Study was planted twice in 2011, but each time, a uniform stand was not established. The study will be started in the greenhouse in 2012 and transplanted in the field during the spring. No data will be collected the first year.

Materials and Methods: A firm seedbed will be prepared by disking and cultipacking prior to planting.

Grass species will be transplanted into two 8 row blocks spaced 8 inches apart and 15 feet long. (*Plant spacing will be every 6 inches.)*

Each 64 in. x 15 ft. plot will be subdivided into five 64 in X 24 in quadrants. Quadrants represent different clipping dates beginning after the first frost, then every month until March. (*Normal first freeze occurs around the 15th of November)*

Soil Test will be taken each year, in order to determine the amount of fertilizer needed to bring the fertility level to a medium level. No fertilizer will be applied during establishment year. Soil sample will be taken before establishment year in order to determine a baseline fertility level.

Sprinkler irrigation will be used as needed to accelerate establishment the first year. No irrigation will be applied in years after establishment.

Weed control should be consistent with normal farming practices for the area with all chemical applications documented.

Experimental design is a randomized complete block with 4 replications/cultivars.

<u>Data collection</u>

Forage samples will be collected from both the clipped and unclipped blocks using a flail-cutting forage harvester. A clipping of 24 inches by 64 inches will be taken at each clipping date to determine yield.

Clipping Dates (approximate)
November 15
December 15
January 15
February 15
March 15

Average plant height will be recorded at time of harvest.

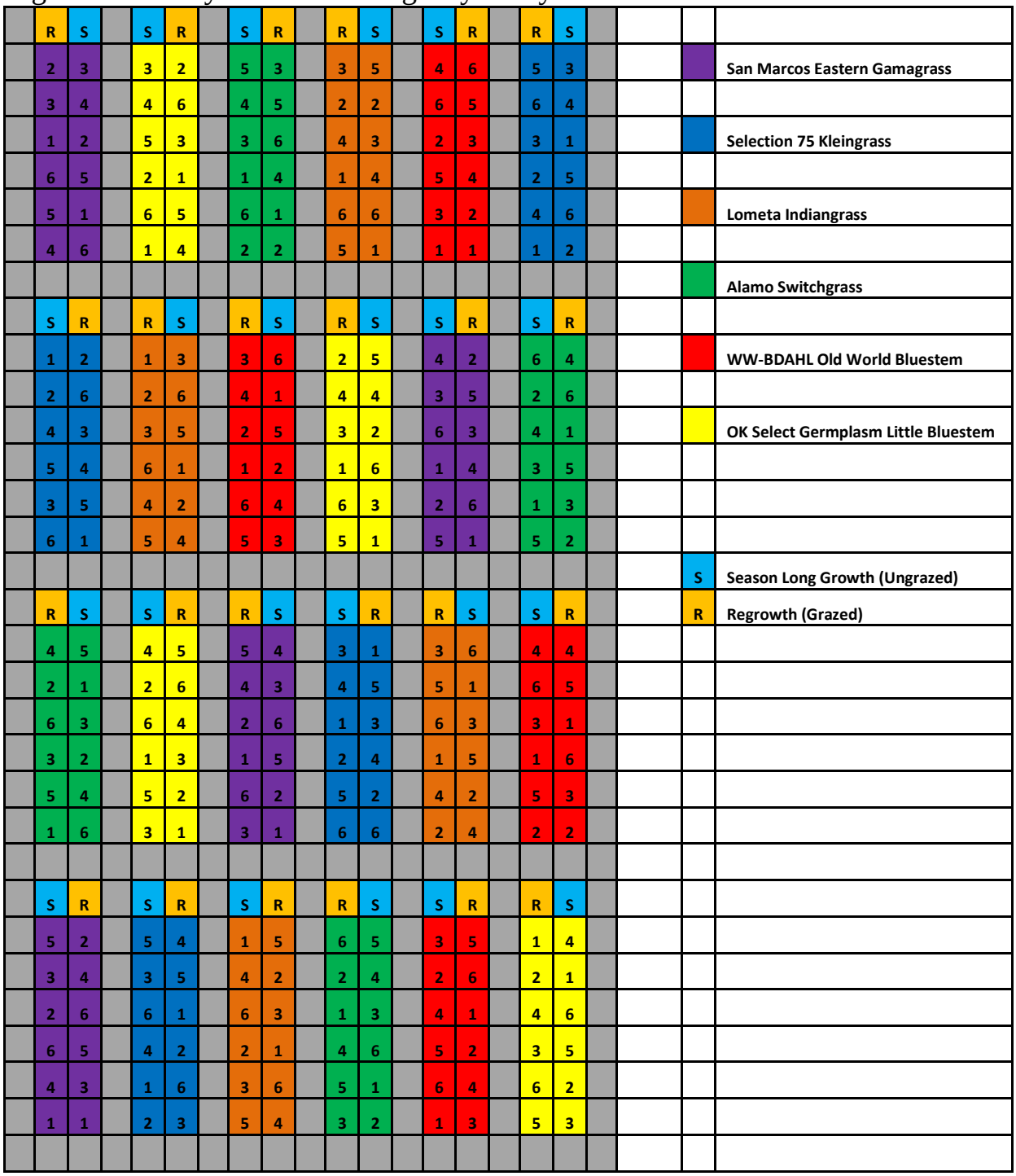
Grass will be clipped six inches from soil surface.

Plot weight will be determined from the 24” X 64” clipping.

A subsample will be collected and oven dried at 55 degree C for 16-24 hrs for dry matter determination and chemical analysis

Sample will be ground through a 1mm screen for % crude protein and % *in vitro* dry matter digestibility

Figure 4 Plot Layout for Standing Hay Study



Study No.: TXPMC-P-1102-RA Initial Evaluation of Roundhead Lespedeza (Lespedeza capitata)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: No collections were received during 2011. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Lespedeza capitata*
Common Name: Roundhead Lespedeza

Morphological Characteristics:

- bean Family (Fabaceae)
- herbaceous native perennial
- erect stems is simple and branched above
- petioles are 2-5 mm shorter than the stalk of the terminal leaflet
- numerous small trifoliolate leaves that are 4.5 1.8 cm and variable in shape and pubescence, often crowded along stem
- leaves and stems densely covered with appressed hairs giving the plant a silvery sheen
- flowers in August and September
- pea like flowers crowded in conspicuous green ball like clusters that are grouped together at the tips of the stems and are often over looked
- flower petals white with purple spot on banner petal
- calyx lobes are all separate and the wings exceed the keel
- cinnamon brown seeds heads after leaves drop
- fruits indehiscent and one seeded
- deep tap roots (2.5 meters) with many branched roots near the soil surface that extends up to a meter in all directions
- found in dry, open woods, sand dunes and prairies

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 550 Range Planting; 512 Pasture and Hay Planting. 562 Recreation Area Improvement; Roundhead Lespedeza is readily eaten by livestock and is browsed by white-tailed deer. Seed are eaten by many species of birds especially bobwhite quail. In western portion of Texas there is a need for locally adapted native (ecotypic) plant materials for use in restoration projects. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

Study No.: TXPMC-P-1103-PA Initial Evaluation of Switchgrass (Panicum virgatum)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Seven collections were received during 2011. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name*: Panicum virgatum*
Common Name: Switchgrass

Morphological Characteristics:

- Warm season perennial sod-forming(upland) bunchgrass(lowland) grass that grows 3 to 10 feet tall that is native to all of US except California and the Pacific Northwest
- Found in all of Knox City PMC's service area
- Stems are erect 3 to 10 ft tall, robust, with short rhizomes; stems firm and tough
- The rhizomes are scaly and creeping
- Sheaths are rounded, often red to purplish at base; blades are 10-24 inches long and 1/8 to 9/16 wide, flat, elongate, adaxial surface at the blade base with a triangular patch of hair
- Distinguished from other warm-season grasses by the hair at the point where the leaf attaches to the stem at all stages of development.
- Ciliate membrane 1/32-5/32 inch long, apex truncate to rounded
- Panicle is 6-24 inches long, pyramid-shaped, open with seed borne on the tips of the branches; lower nodes with branches in whorls
- Spiklets have 2 florets, the lower florets are sterile or staminate ,the upper floretsperfect and fertile; the upper lemma 1/8-3/16 in long, and are smooth and shiny, the margins clasp the palea
- The glumes are unequal, acute to acuminate, the first glume is 3/4th the length of the second and encircles the base of the second glume
- The glumes, lemmas, and paleas are awnless
- Starts growth in March and April and seed mature late lte August through October, the flowering and seed maturity is different on the same panicle.
- Ripe seeds sometimes take on a pink or dull-purple tinge, and turn golden brown in the fall
- Reproduces from seed, rhizomes, and tillers
- Two major forms have developed , lowland and upland, upland types are generally shorter have more vigorous rhizomes making them more sod forming, upland have more cold tolerance, lowland are more sensitive to moisture stress; the Knox City PMC is interested in collecting both forms

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 550 Range Planting; 512 Pasture and Hay Planting. The planting of switchgrass can provide excellent food and cover benefits for wildlife and livestock as well as help conserve our soil. In our service area there is a need for a less aggressive switchgrass in mixes for wildlife habitat. Switchgrass could also be an important biofuel plant and a cooperative project with Oklahoma State University will screen these accessions for this purpose. The accessions will be gene mapped by OSU and possibly be used in developing cultivars for biofuel production. Your assistance in collecting this plant helps support this effort
and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

Study No.: TXPMC-P-1104-PA Initial Evaluation of Plains Lovegrass (Eragrostis intermedia)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: One collection was received during 2011. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Eragrostis intermedia* A.S. Hitchc.
Common Name: Plains Lovegrass

Morphological Characteristics:

- native, perennial bunchgrass
- warm season
- leaves are 6-8 in long and less that ½ in wide
- pyramid-shaped panicle 8-16 inches long and 6-12 inches wide
- has long, silky hairs in the axils of the lowermost branches of the seed head
- plant height is 2-3½ feet tall
- spikelet has 3-9 flowers
- seed is reddish-brown with a rectangular shape
- starts growth in early spring
- flowers from June to November
- reproduces from seeds and tillers
- primarily found on dry, sandy, clayey, or rocky soils

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 327 Conservation Cover; 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement; 550 Range Planting; 512 Pasture and Hay Planting; 332 Contour Buffer Strips; 393 Filter Strips; and 528 Prescribed Grazing. The planting of plains lovegrass can provide good forage value for livestock as well as fair food and cover benefits for wildlife. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

Study No.: TXPMC-P-1105-PA Initial Evaluation of Hall's Panicum (Panicum hallii)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: One collection was received during 2011. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Panicum hallii* Vasey
Common Name: Halls Panicum

Morphological Characteristics:

- native, perennial bunchgrass
- warm season
- leaves are flat and glabrous
- curling basal leaves at maturity or when dried
- panicle is outline pyramidal with few branches
- spikelets are located on short pedicels
- plant height is 6-28 inches with nodes that can be glabrous to pubescent
- starts growth in early spring
- flowers from April to November
- reproduces from seeds and tillers
- occurs on dry, arid soils
- adapted to sand or clay soils, particularly calcareous soils

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 327 Conservation Cover; 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement; 550 Range Planting; 512 Pasture and Hay Planting; 332 Contour Buffer Strips; 393 Filter Strips; and 528 Prescribed Grazing. The planting of Halls panicum can provide fair forage value for livestock and wildlife. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

Study No.: TXPMC-P-1106-RA Initial Evaluation of Scurfpea (Psoralea tenuiflora)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: Five collections were received during 2011. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Psoralea tenuiflora*
Common Name: Scurfpea

Morphological Characteristics:

- native forb
- warm season
- 8-20 inches tall with many branches
- Stems are erect or ascending, 1 to several, wiry, longitudinally ridged, grayish hairy, stems readily disarticulates from crown at maturity
- Leaves are alternate, palmately compound, stem-leaves 5 foliate, branch leaves often 3-foliate: leaflets elliptic to oblanceolate, ½ to 2 inches long, ¼ to ½ inch wide, densely pubescent below and on margins, very sparse pubescent above. Surface glandular dotted
- flowers are solitary to 4 per node, pea-like up to ¼ inch long, 5 blue-violet petals and a short calyx with 5 teeth, calyx green to purple, flowers June- August
- seedpod is about ¼ inch long, ovoid and flattened, terminating into short beak, single seed, seed matures at different time on the plant
- root system is a long slender deep taproot, very drought tolerant
- adapted to dry sandy or rocky prairie, plains, open woods and along roadsides
- Distributed throughout Texas except for the Pineywoods and the South Texas Plains.

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement; 550 Range Planting. The planting of Scurfpea provides a pollinator source for several bee species and can provide food for wildlife as well as help conserve our soil. It is a host for nitrogen fixing bacteria. In western portion of Texas there is a need for locally adapted native (ecotypic) plant materials for use in restoration projects. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

Study No.: TXPMC-P-1107-WL Initial Evaluation of Narrow Leaf Globe Mallow (Spaeralcea angustifolia)

Objective: Collection and evaluation for a superior plant for use as an improvement of range and pastureland, and provide food and cover for wildlife.

Evaluation Factors: The following traits will be evaluated: green up date, vigor, height, maturity, uniformity, seed production, leaf and stem dimensions, susceptibility to insect, disease, and cold, and drought tolerance.

Progress or Status: No collections were received during 2011. Species will remain on the plant collection request list in hopes of adding more samples to this collection before moving forward into rod rows.

Scientific Name: *Sphaeralcea angustifolia*
Common Names: Narrow Leaf Globemallow, Copper Globemallow

Morphological Characteristics:

- Cool season
- Drought tolerant
- Plant height 1 to 4 ft, most common around 18 inches.
- Habitat: prairie, plains, pastures, savannahs, hillsides, slopes
- stems are spreading to erect, stout, somewhat branched, leafy, densely covered with star-shaped hairs
- leaves are alternate, lowest long-stalked, others short-stalked, oblong-lanceolate to linear-lanceolate,2-4 inches long, ¼ to 1 inch wide, firm; margins toothed with shallow, rounded teeth, scratchy star-shaped hairs, gray-green in color
- Inflorescences: panicle, compact, many-flowered, conspicuously leafy: flowers clustered in leaf axils.
- The flowers are ½ to ¾ inch wide; stalk stout, shorter than cailx; calyx 1/5 to 2/5 inch long, 5 lobed; lobes lanceolate to triangular; tips pointed 5 petals, ¼ to ¾ inch long, the color is variable, red, orange, salmon, or violet, tips notched; stamen column half to nearly as long as petals; 10-15 carpels
- Flowers bloom at various on entire plant
- Blooms March-November
- Seed are in capsule that is egg shaped to ellipsoid, 1-3 seeded, star-shaped hairy or nearly glaborous; seeds are kidney-shaped

Conservation Use:

Why collect this plant? Texas Plant Materials Centers have identified this plant as having potential benefits to the following conservation practice standards: 645 Upland Wildlife Habitat Management; 342 Critical Area Plantings; 562 Recreation Area Improvement; 550 Range Planting. The planting of Narrow Leaf Globemallow can provide food and cover benefits for wildlife, it is a good pollinator plant, and can help conserve our soil. There is a need for cool season pollinator plants to extend the blooming period in conservation plantings. Your assistance in collecting this plant helps support this effort and the NRCS conservation practice standards which are employed daily to conserve the natural resources of Texas.

Study No.: TXPMC-T-1108-PA Germination and Emergence of Three Cultivars of Switchgrass

Objective: Switchgrass (*Panicum virgatum*) can be difficult to establish in certain areas. Germination and emergence at the James E. "Bud" Smith Plant Materials Center in Knox City, TX has historically been successful in most years. Other areas have noticed difficulty establishing switchgrass. Three cultivars, 'Alamo', Cimarron, and Kanlow will be grown in a replicated test to determine whether this is due to cultivar differences or environmental conditions. Harvested seed will be compared by germination and emergence.

Evaluation Factors: Cultivars will be evaluated by testing the germination and emergence in a replicated study.

Progress or Status: Plots were started in the greenhouse and transplanted in the spring of 2011. Irrigation was provided to aid in establishment. Seed was harvest in the fall of 2011 for germination and emergence tests.

Materials and Methods: A firm seedbed will be prepared by disking and cultipacking prior to planting.

Grass species will be transplanted into three ten foot plots with plants spaced every foot.

Plots will be irrigated as needed to accelerate establishment the first year. No irrigation will be applied in years after establishment.

Experimental design is a randomized complete block with 3 replications/cultivars.

Weeds will be controlled using normal farm management practices. Trifluralin will be incorporated each year for pre-emergence control of weeds.

Data collection

Seed will be harvested at maturity each year from the inside eight plants by hand stripping the seed head.

Harvested seed will be cleaned and bulked for each replication

Samples will be divided into three treatments to determine the dormancy within cultivars. One treatment will be placed in cold storage for 4 weeks. The second treatment will be placed in cold storage for 8 weeks. The third treatment will not be placed in cold storage.

A germination test will be conducted on each plot by placing 1 sample per rep of 100 seed in a germinator for twenty-eight days. Samples will be counted on day 3, 5, 7, 14, 21, and 28. Seed are considered germinated when 4mm of both root and shoot are observed.

100 seed will be planted for each replication in the greenhouse to determine emergence. Seedlings will be counted and measured for height every three days for 30 days.

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